The Mining Journal

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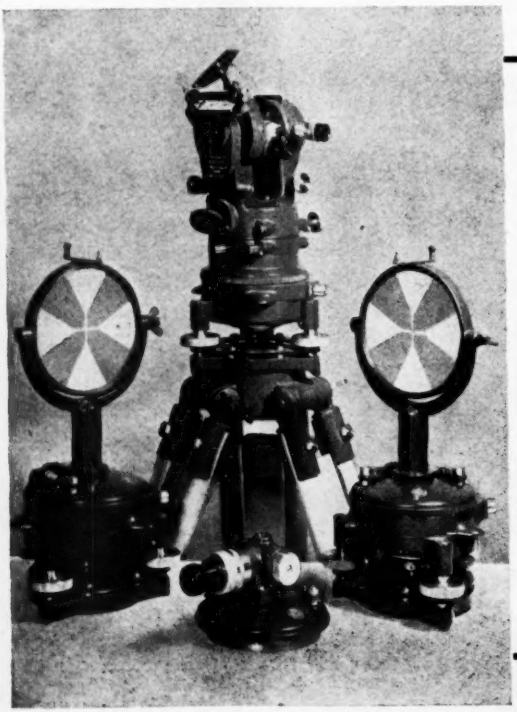

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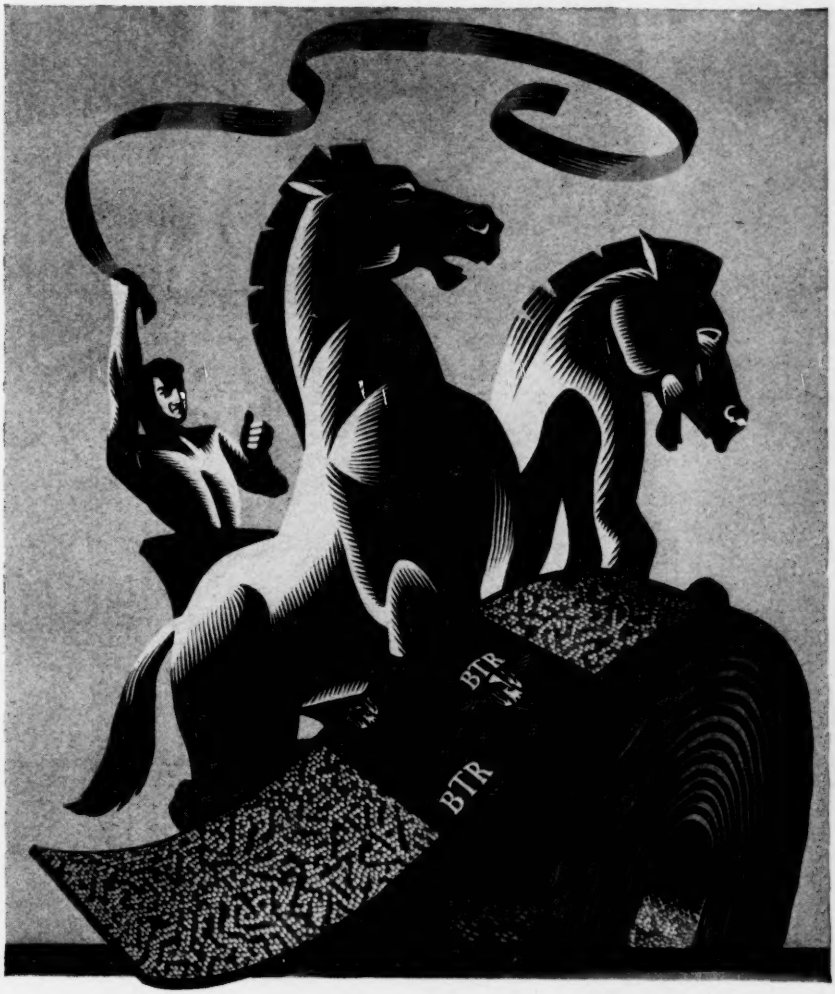

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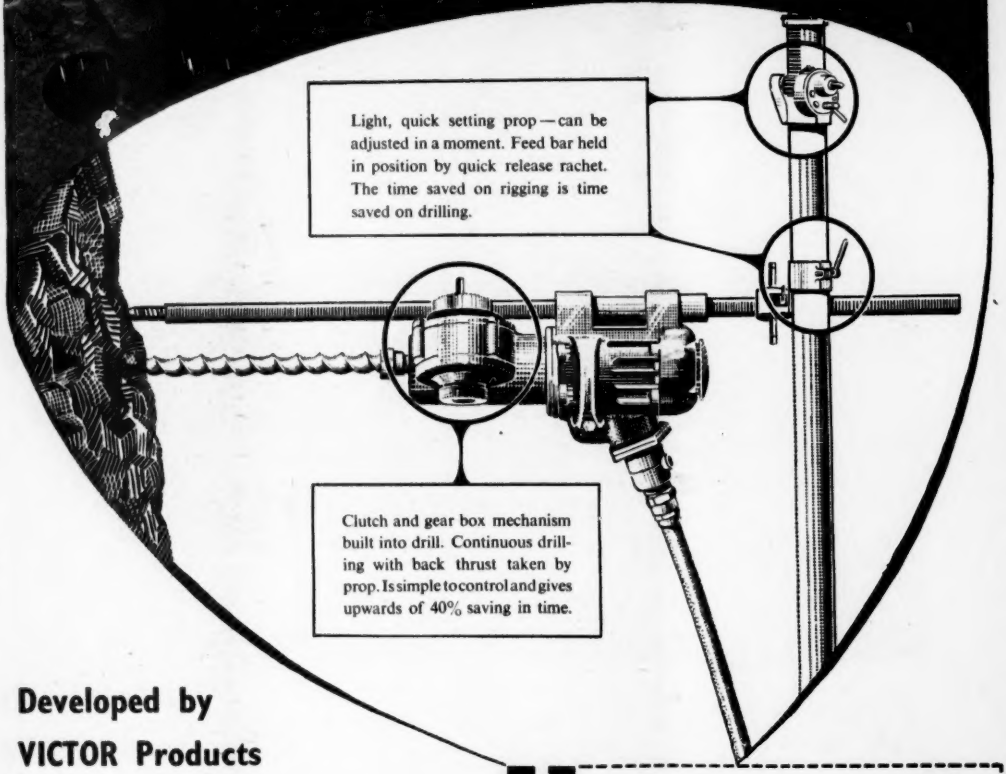

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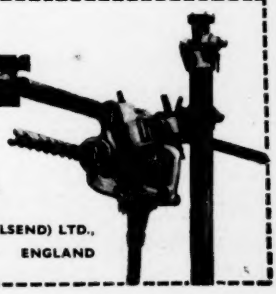

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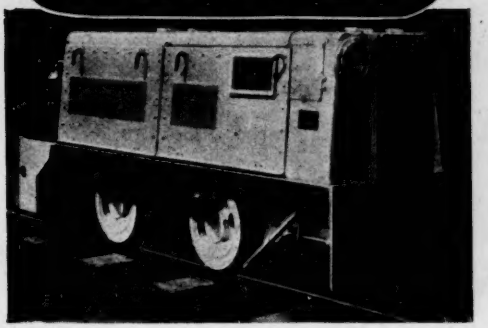

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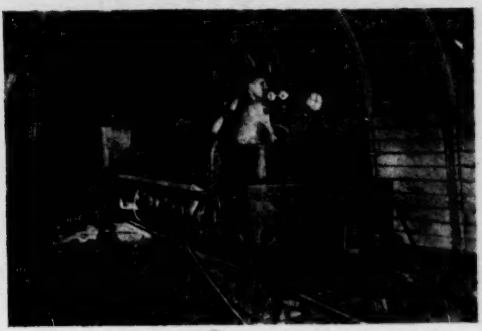

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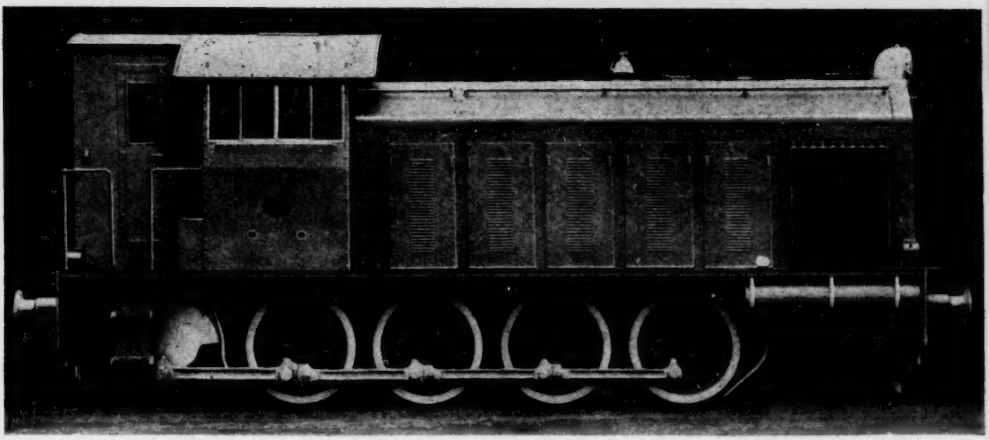

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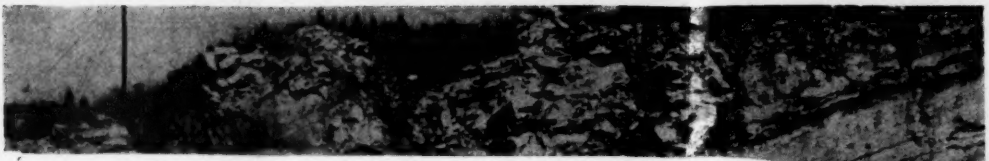

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NOTES AND COMMENTS

The Easing Metal Position

Since the turn of the year the world's apparent metal supply position has been easing markedly, as is indicated by the considerable falls which are taking place in free market prices, and also by the increased supplies of several metals which both British and American civilian industry has in prospect for the coming months.

Not unnaturally, the familiar agitations for doing away with controls are being reinforced in the States by these developments but it has yet to be shown that the easing in the situation is not in fact more apparent than real. Certainly a number of short-term factors are operating to cause a temporary easement.

As prices began to weaken, manufacturers ceased anticipatory buying at grey market prices and cut their purchases to current requirements. In some cases, they now even appear to be running down stocks.

Secondly, shortages of certain key metals, such as steel in Britain and copper in the States are themselves imposing artificial restrictions on the consumption of other metals. Thus the use of lead in car batteries is governed by the allocation of steel to the automobile industry.

Thirdly, the general policy of allocations and control of civilian uses is producing an artificial restriction of demand, while, at the same time, due to the re-programming of defence production schedules and the failure in the early stages of some manufacturers to meet their production targets, the immediate metal requirements for military uses have eased and resulted, for example, in the announcement by the D.P.A. this week that some 15,000 additional tons of aluminium and 12,500 additional tons of copper would be diverted to civilian industries during the second quarter of the year.

It is clear that all the above factors, other than the continued operation of control on use, are unlikely to have more than transitory effect. On the other hand, the various long-term projects for expanding metal production which have been pursued with such energy in America and elsewhere will be progressively bearing fruit over the next five years and if the various targets are realized, it does appear as if increasing supplies will become available to keep pace with the gathering momentum of military production without further embarrassment to the civilian consumer.

In so far as it is practicable to endeavour to look far ahead in these days, it is the period following the completion of the present metal output expansion schemes which must provide the really testing time.

In the absence of a major war another five years should see the easing off of defence production. In this situation the menace of the stockpiles overhanging the commodity markets will become real and general policy in Washington towards their use may look very different from what it does to-day. If in 1952 the West's capacity for hurried military preparedness may prove to have saved the Peace, it may well be that by 1957, if not sooner, it will be by our capacity for controlling falling commodity prices and redundant stocks, that we shall have to disprove the oft-quoted Marxist belief that Capitalism carries within itself the seeds of its own destruction.

Important U.S. Titanium Developments

Because of its valuable specific properties, such as high heat and shock resistance, hardness, high melting point, and resistance to abrasion and corrosion, titanium has been in increasing demand by the metallurgical industry and, more recently, rearmament has given a new and powerful impetus to research and development work connected with its uses. Thus, the president of the Kropp Forge Company, Chicago, Mr. Ray A. Kropp, has just announced that, after 14 months of research on the forging of titanium alloys, his company had succeeded in establishing quantity production of titanium alloy bar forgings with excellent surface finishes, both for industrial and military purposes, especially for use in jet engines. Mr. Kropp added that manufacturers of transport equipment would be most interested in this development, because of their efforts to reduce weight and increase load capacity.

The company's titanium research programme is being expanded, especially as each new titanium alloy presents a new forging problem. The difficulties encountered in forging titanium are described as having been similar to

those in stainless steel; moreover, the design and operation of the dies used are also important factors as the abrasive action of titanium accelerates the wear of the dies. However, the Kropp Forge Company has been successful in overcoming the inherent difficulties of the metal, and Mr. Kropp declared that while the open die forging of shaped rings, blanks and bars originally presented serious problems, his company now had succeeded in turning out excellent forgings in these shapes. He emphasized that close temperature control as well as experience in working this material were prerequisites for obtaining close tolerance work free from defects, and he revealed that because of the high-density metals required in aircraft forgings, titanium and stainless steel among them, new and heavier hammers were being installed both to supply the necessary additional power and to increase the plant's capacity.

The development just revealed by the Kropp Forge Company follows the announcement made last autumn by Horizons, Inc., of Cleveland, Ohio, concerning the development of a new process for the production of titanium metal, which is expected to reduce its cost (which amounts at present to $5.00 per lb. for sponge metal) by more than 80 per cent. Meanwhile, E. I. du Pont de Nemours & Co., Wilmington, Delaware, has revealed that production of titanium metal is being stepped up at a rapid pace. In 1948, this company started the world's first small-scale commercial production of ductile titanium metal at Newport, Delaware. At that time, rated capacity was 100 lb. a day, but it rarely exceeded 50 lb. However, a new plant has been built at Newport where production is now running at the rate of 3,000 lb. per day, and is expected to reach 5,000 lb. before the end of this year. The importance attached by the du Pont group to titanium developments is illustrated by the fact that it is spending about $1,000,000 a year for research on this metal.

Although strides have been made in the production and melting of titanium—which were in an elementary stage three years ago—research has still failed to provide a continuous production process which would be the key to mass production of low-priced metal, but the company is continuing extensive research in that direction and, although improvements in the manufacturing process are known to have been made, details are not being released at this time. However, this much is known: it still involves a reaction of titanium tetrachloride with magnesium, but this differs from that originally used when production was first started.

It is significant that despite the potentialities of this metal, production actually exceeds the development of uses. However, as the defence programme moves ahead, demand is expected to go up substantially, thus requiring greater capacity. Thus far, Du Pont has been the chief, but by no means only producer. It was the sole commercial producer in 1948, when its total output was about 5,000 lb. Before that date, the U.S. Bureau of Mines was producing titanium, but for research purposes only and, since then, a number of other titanium producers have come into the field, including Rem-Cru Titanium, Inc., a firm formed jointly by Remington Arms and Crucible Steel, and the Titanium Metals Corp. of America, which was organized by National Lead Company and Allegheny Ludlum Steel. In addition, Sharon Steel has announced plans to produce titanium sheet and, in Canada, the Quebec Iron and Titanium Corporation (created by Kennecott Copper and New Jersey Zinc Company) will work, by open-pit methods, the large body of ilmenite ore comprising the Allard Lake deposit in Quebec, Canada.

As an important, if not major factor in the entire development of titanium, Du Pont has pioneered the melting and ingot casting of the metal and has guided the fabricating industry in this important phase. The metal, as produced by Du Pont in the form of sponge, look like silvery gray coke. But since titanium quickly combines with gases in the air at high temperatures, casting it into solid metal ingots presented one of the problems that appeared to be insoluble. However, research teams overcame these difficulties by designing and building two special furnaces at the Newport plant for induction and arc melting of the metal by surrounding it with inert gases. Both furnaces are large enough to approach commercial production. In one of them, more than 15 tons of metal have been melted and ingots up to 650 lb. are now being cast. The mere fact of ingot size is considered of primary importance in the industry and the growth from the first 10 lb. ingot—itself a major achievement—has been watched with much interest. The other furnace, based on arc heating, may hold the key to the continuous melting and casting of titanium, one of the factors necessary for mass production of the metal. In it, ingots can be formed continuously from molten metal, then cut to suitable lengths. Furnaces of this type are now producing ingots as large as 1,200 lb. Meanwhile, the first large-scale and self-contained plant for the production of titanium metal is being built at Henderson, Nevada, by the above-mentioned Titanium Metals Corporation, which is already the largest supplier of titanium sponge metal. This plant will have an initial output of 3,600 tons of titanium ingots a year.

Israel Exploiting Mineral Deposits in the Negev

The chief engineer of Israel Mining Industries, a Government-owned company formed in March 1951 to exploit mineral resources in the Negev—the southernmost part of Israel—has summarised the results of the company's work. He discloses that the mining stage has been reached in the cases of phosphate rock, ceramic clays, and glass sands. A geological survey for mica, feldspar, and quartz is being completed, and another survey has already been commenced for sulphur; moreover, exploration is being continued for copper, manganese and iron ore.

With regard to phosphate rock—known reserves of which total over 100,000,000 tons—work has already started with the limited equipment available, while modern mining machinery has been purchased abroad and is expected shortly. According to the Premier of Israel, the output will not only suffice for local needs, but exports of about 250,000 tons of phosphate will be possible next year, and it is likely that this quantity will be increased later.

Copper and manganese ores occur extensively in an area about 25 kilometres north of Elath. The copper ore should lend itself to easy extraction, but it has not yet been established whether the ore occurs in sufficient quantities. The manganese ore reserves total at least 2,000,000 tons and it is hoped that, through suitable methods of concentration, a sufficiently high-grade export product can be obtained. Israel's own manganese requirements will remain comparatively small in the foreseeable future.

Iron ore outcrops have been found which seem sufficiently extensive to justify a thorough geological survey and small-scale mining exploration. The ores found so far are of relatively poor quality because of a high silica content, but attempts are being made to locate some areas where the composition of the ores may be more favourable.

Interesting deposits of mica and feldspar are also known to exist in the Elath region. Their survey, which is nearing completion, has been undertaken with a view to ascertaining whether eventual exploitation will be practicable.

Finally, industrial and laboratory tests on the extensive ceramic clay deposits found some 50 kilometres south of Beersheba indicate that they are of average quality and that they can be used to replace most, if not all, imported raw materials for the manufacture of sanitary ware, earthenware and fire-bricks.

Mining in Tanganyika in 1951

The total value of all mineral exports (domestic production) from Tanganyika during 1951 is provisionally estimated by the Mines Department, Tanganyika Territory, at £1,568,979. In addition, minerals provisionally estimated to be worth £285,985 were produced and consumed locally. Final figures await the receipt of certain outstanding account sales. The total estimated value of all minerals exported or consumed locally, i.e., £1,854,964, represents a provisional decrease of £211,940, compared with 1950. As in 1950, this decrease in exports was again due to the suspension, throughout the year, of diamond exports and sales by Williamson Diamonds Ltd., as a result of the dispute between that company and the Diamond Corporation, but production was maintained. Further details of the Territory's mineral exports are given in the accompanying table:

Tanganyika's Principal Mineral Exports (Domestic Production)

Mineral	*Unit*	1950 *(Actual figures)* *Quantity*	1950 *Value* £	1951 *(Provisional figures)* *Quantity*	1951 *Value* £
Gold (unrefined bullion)	oz.	125,267	824,047*	129,439	847,832*
Diamonds	ct.	70,597	746,370†	8,593	86,749
Tin conc.	l.tons	129.4	76,078	92.09	67,704
Salt	metric tons	3,936	36,008	3,870	35,496
Mica, sheet	l.tons	49.08	61,054‖	69.96	120,370
,, ground	,,	58.64	1,223	—	—
,, waste	,,	25	337	—	—
Kaolin	metric tons	18	182	46.86	507
Lead conc.	l.tons	1,093.36	97,550	2,964.59	334,256
Tungsten conc.	,,	40.50	14,284	39.26	61,007
Magnesite	,,	81.57	489	2,672.80	13,539
Copper ore	,,	8.75	332‖	—	—
Lime	,,	70.00	280	190.00	850
Graphite (crude)	,,	—	—	25.00	669

*Includes value of gold and silver contained in auriferous and lead concentrates.

†Provisional (some consignments unsold).

‖Provisional.

Exports of unrefined gold bullion amounted to 129,439 oz. provisionally valued at £847,832 (including gold contained in auriferous concentrates) compared with 125,267 oz. valued at £824,047 in 1950. Rising costs have offset the increase in the price of gold resulting from the devaluation of sterling in 1949, but the decision taken in October, 1951, to permit up to 40 per cent of production to be sold for dollars in the premium market had, by the end of the year, yielded to producers who availed themselves of this arrangement a gross premium of approximately 28s. 9d. an oz. or 22s. net, after deduction of charges and royalty, equivalent to a net increase of approximately 8s. 9½d. an oz. on total production in those cases where the full 40 per cent was sold in the premium market. Even so, a further substantial increase in the price of gold is required before the local gold mining industry can be re-established on a sound footing.

The value of lead concentrates exported increased from £97,550 in 1950 to an estimated total of £334,256 in 1951. A trial shipment of 25 tons of crude graphite was exported valued at £669. The export of magnesite continued, all production going to Kenya, and totalled 2,673 tons valued provisionally at £13,539. Increased tin prices failed to have any effect on production, which again declined. Exports of tungsten concentrates were approximately the same as in the previous year, but the estimated value was over four times greater. Exports of sheet mica were 21 tons higher than in 1950 and the estimated value—£120,370—was nearly double. No exports of waste or ground mica were made.

At the end of 1951, there were current 16 exclusive prospecting licences in respect of areas totalling, in the aggregate, 2,872 sq. miles, and 2,118 mining leases and claims covering 396 sq. miles. Marked interest continued to be shown in base metal prospecting by leading mining houses and, during the year, the grant of exclusive prospecting licences in respect of a further 1,931 sq. miles was approved, as follows: 261 sq. miles in the Ufipa District; 194 sq. miles in the Kilosa/Mpwapwa Districts; 1,042 sq. miles in the Dodoma/Kondoa Districts and 434 sq. miles in the Bukoba District. The foregoing includes an area of approximately 44 sq. miles in the Karagwe tinfield, Bukoba District, granted under exclusive prospecting licence to the Colonial Development Corporation. A number of small-scale tin producers in the area were bought out by the Corporation and a systematic prospecting programme for tin deposits was initiated. In the Western Province, areas of 408, 52, 307, and 149 sq. miles were being actively examined for base metals under exclusive prospecting licences by leading mining companies. An application for a mineral oil exploration licence was made in respect of the coastal region by an important oil group and was under negotiation with the Government at the end of the year.

The erection of a pilot plant by New Consolidated Goldfields Ltd. at the extensive kaolin deposits near Pugu, 17 miles from Dar-es-Salaam, was completed. At the Williamson diamond mine, a new power station, housing two 900 k.v.a. units, and foundations for a third, was completed. At the Geita gold mine, there was an increase in tonnage treated and gold produced. New Consolidated Goldfields Ltd. have been appointed consulting engineers. At Mpanda mine, the pilot plant continued to operate satisfactorily and 2,965 tons of lead concentrates were exported; moreover, underground development continued.

RUHUHU RIVER BASIN COAL DEPOSITS

In the Songea and Njombe Districts, the Colonial Development Corporation, with the assistance of the Geological Survey Department, continued the investigation, commenced in 1949, of the coal deposits in the Ruhuhu River basin. It was announced by the Corporation that the extensive programme of geological mapping and diamond drilling had been successful in indicating the existence of an estimated 40,000,000 tons of extractable coal, while the gross tonnage so far located was probably several times this figure, but not all mineable.

Smelting tests in Sweden on titaniferous iron ore from the Liganga deposits, about 35 miles distant from the coalfield, were initiated by the Geological Survey Department and have demonstrated the feasibility of treating this ore satisfactorily. The development of these mineral areas is intimately related to the question of railway development in the southern and south-western regions of Tanganyika, which is now under examination by the Government. For full details, see "Developing Tanganyika's Coal Deposits," and "Conference on Tanganyika's Basic Industries," in *The Mining Journal*, October 26, 1951, and November 16, 1951, respectively.

The following figures illustrate the situation as to labour employed in mining and prospecting under exclusive prospecting licence, which averaged per month (Jan. to Sept. averages): European, 419; Asian, 231; African: Surface, 14,586; Underground, 3,569; giving a total of 18,805.

COLONIAL MINERALS DEVELOPMENT—V

British Guiana

By A. G. THOMSON

A description of British Guiana's mineral deposits, chiefly gold, diamonds, important occurrences of bauxite, columbite, manganese ore, and the uranium containing mineral, euxenite, is given in the following article—the fifth in a series on the mineral wealth of the smaller British territories overseas.

British Guiana covers an area of approximately 83,000 sq. miles and has a coast line of about 270 miles, extending almost from the eastern boundary of the Orinoco to the river Courantyne. The Colony is bounded on the North by the Atlantic, on the South and South-West by Brazil, on the East by Dutch Guiana, and on the West and North-West by Venezuela. Large rivers abound and with their tributaries form a vast network of waterways.

British Guiana is one of the world's largest exporters of bauxite. Gold and diamonds have been produced in the Colony for many years, but the output of both these commodities has declined. Deposits of low-grade manganese have been found and also columbite, euxenite, kaolin and iron ore. Other minerals have been located, but so far not in workable quantities.

The Colony's Geological Survey was instituted in 1933 under a loan from the Colonial Development Fund. Far more time has since been devoted to prospecting than is generally considered to be within the province of a Geological Survey. This policy has been dictated by the economic needs of the Colony, coupled with the fact that much of the mineral wealth appears to lie in deposits which can be studied only by prospecting. Grants given under the Colonial Development and Welfare Act have enabled the activities of the Geological Department to be greatly extended. The staff now consists of eleven geologists, five of whom arrived in 1950. In addition, a geologist of the U.S.G.S. has been attached to the Department under the E.C.A. scheme.

Since September, 1950, the Survey has occupied buildings in Georgetown, formerly used for the accommodation of East Indian immigrants. The expansion programme provides for the construction of a central headquarters in Georgetown, with petrological and assay laboratories, etc. It is proposed to allocate the chemistry and physics laboratories and adjoining buildings of Queen's College for the use of the Survey when the College moves, in the very near future, to a new building now under construction. Good progress is being made in the construction of district offices at Lethem (Rupununi District), New Amsterdam and Mabaruma (Northern Western District).

GOLD AND DIAMONDS

Great importance is attached to the systematic investigation of gold and diamond occurrences. Between 1884 and 1941, British Guiana produced 3,028,745 f.oz. of gold valued at $56,035,745. Production reached its peak in 1893/94 with an annual output of 138,527 oz., but dwindled to 6,083 oz. in 1928. A slight revival of the industry then took place and, by 1938, the annual production had increased to 41,919 oz. In recent years, however, the total gold output has been less than 20,000 oz. a year. The largest producer is British Guiana Consolidated Goldfields which, during the year ended July 31, 1950, won 6,105 oz. from dredging operations on the upper Mahdia and lower Potaro rivers. Since the war, several companies have spent considerable sums on prospecting, development and mining operations, sometimes with disappointing results.

According to the Director of the Geological Survey, Mr. Smith Bracewell, the essential feature of the goldfields of British Guiana is the combination of the widespread occurrence of multitudinous reefs or rich gold-quartz stringers with the flat topography and low gradient of the rivers. These conditions combine to produce widely-scattered rich gold alluvials. Since the bulk of the gold production in the past has come from the working of small, rich creeks by the small worker, or "pork-knocker," as he is locally called, the best of these in the known goldfields are exhausted. Only in areas near the inaccessible Brazilian border can values such as were obtained towards the end of the last century be expected. There remain what might be termed the intermediate-sized workings, which are too big or too deep for the "pork-knocker" to handle, unless aided by a little capital; yet, however, when taken singly, they are too small to attract a big company. A few areas may represent company propositions by themselves, but in most cases the company would require to be divided into units, each operating one of the intermediate-sized deposits.

DIFFICULTIES OF MECHANIZATION

While it is believed that the flats of some of the larger streams could be successfully treated by mechanical units, it is unlikely that the working of the smaller streams and the residual and high-level deposits could be mechanized. These have been examined repeatedly by experts from abroad, and a few mechanical units have been installed without success, the gold continuing to be produced by hand methods. Several dredges have operated successfully, but unduly high overhead expenses resulted in some failures. About one-fifteenth of the 3,000,000 oz. of gold produced in the Colony have been obtained by dredging, about one-thirtieth by milling, and about one-seventieth by large-scale hydraulic operations. The remainder has been recovered mainly by hand methods from thousands of small workings.

Diamonds were first discovered in the Colony in 1887. The reports of the Lands and Mines Department indicate that the aggregate production from 1901 to the end of 1944 was 2,278,323 ct. The maximum annual output was in 1923, when 214,474 ct. were produced. Latterly, production has been in the region of 30,000 ct. annually. In its early stages, the diamond industry was in the hands of syndicates, but since 1912, the bulk of the output has been due to the activities of individual miners operating the "tom" and hand sieve.

The deposits are entirely alluvial, and no source rocks have yet been recognized. Most of the deposits are comparatively shallow gravel in the beds of small streams and adjoining flats and terraces. The concentration of the diamonds in these gravels varies from abnormal yields of 16 ct. per cu. yd. of gravel downwards to the lowest workable figure. The richest deposits have been found in tributaries of the Mazaruni and Potaro rivers, in areas situated near the base of the escarpment formed by the Kaieteurian Sedimentary Series, and particularly in proximity to the outcrops of the coarse conglomerates of this series. It is, therefore, presumed that the diamonds have been derived mainly from the disintegration and reconstruction of the conglomerate.

The future of the diamond industry in British Guiana may be largely dependent on the possibility of working

the alluvial deposits in the beds of the larger rivers by dredging. Interest has been shown in this possibility by commercial firms. One or two recent ventures have proved disappointing, but a considerable amount of active prospecting is still in progress.

SYSTEMATIC SURVEY OF ALLUVIAL DEPOSITS

During the first field season of 1950, a systematic survey of an area of 250 sq. ml. in the Putareng section of the Mazaruni District was carried out by geologists stationed at the District Headquarters, Bartica, in the Mazaruni-Potaro District. One of the objectives was the investigation of extensive diamond-bearing alluvial deposits, which have been worked during the past fifty years. The results of the survey indicate that the deposits are the denuded remnants of the alluvial deposits of a fairly well-defined former river channel parallel to, and about 60 ft. higher than the present Mazaruni River. The central portion of the area surveyed consists of a granitic intrusive, the margins of which trend north-westward towards the Cuyuni River. Gold deposits occur near both the north-eastern and south-western margins of the granitic intrusive, and a small deposit of iron ore was found on the south-western margin.

This survey was subsequently extended north-westward to the Cuyuni River, where it forms the international boundary with Venezuela, the chief objective being the investigation of gold and diamond deposits. The results indicated an extension of the geological conditions governing gold deposition north-westward from the Issineru goldfield towards the Cuyuni River as well as the probable occurrence of diamond-bearing alluvial deposits in terraces of the Cuyuni River and elsewhere. A detailed investigation of the Roraima Formation was started in this area. During the first field season of 1951, this survey was extended westward to the Venezuelan boundary and an extensive reconnaissance was made of the Roraima Formation further south. More information was obtained concerning the occurrences of gold and diamonds in the Wenamu, Ohnopi and Ekereku Rivers.

The densely forested nature of a large part of the Colony makes the progress of prospecting slow, most of the work being done by cutting trails blindly through the forest. In the course of the investigations described, a trail was cut and surveyed from Issineru Village, Mazaruni River, to Mekura Point, Cuyuni, and last year a branch trail was cut from Awarapari River, Mazaruni, to intersect the main trail. These trails will facilitate access by prospectors to the potential gold and diamond areas. Activity in this section of the Cuyuni River has increased, and some encouraging diamond discoveries have recently been reported.

Last year's programme of work also included a reconnaissance of the diamond-producing areas near the Ireng River. A systematic survey was started of part of the Kanuku Mountains. It led to the discovery of an occurrence of mica with crystals measuring 6 in. diameter, which is regarded as warranting further investigation.

The E.C.A. geologist devoted particular attention to the diamond deposits of the Kurupung area, Mazaruni, where a company is engaged in prospecting operations with the aid of a loan by the U.S. Government. This geologist also visited the Aurora Mine shortly before the final suspension of operations by the Cuyuni Goldfields Co., and prepared a report.

EXTENSIVE BAUXITE DEPOSITS

Bauxite is exported by the Demerara Bauxite Co. Ltd. and the Berbice Co. Ltd., whose aggregate output approaches 2,000,000 tons a year. The Colony's resources of this mineral appear to be virtually inexhaustible. A reserve of 10,000,000 tons, for example, is suggested for a deposit where the ore body extends for over a mile with an average width of half a mile. This is only one of many extensive occurrences which have been found. The chief bauxite deposits occur in three separate areas, namely Mackenzie on the Demerara River, the Ituni River, and near Kwakani, Berbice River.

Ferruginous primary laterite occurs as small plateaux on many of the extensive gabbro sills in the northern part of the Colony. It has been suggested that these have potential importance as a source of aluminous abrasives. Their occurrence in proximity to the sources of cheap high-head water power along the Kaieteurian escarpment might have significant consequences. Vast deposits of kaolin have been uncovered by the removal of overlying bauxite in the Mackenzie area.

Columbite has been found in the basins of the Rumong-Rumong and Morabisi Rivers, about 110 miles west of Georgetown, within an area some 133 miles long and eight miles wide. There are indications of a possible reserve of about £1,000,000 worth of columbite, valued at 25c. (U.S.) per lb. The gravels contain about 3 lb. of the mineral per cu. yd., and by hand panning one man can recover from 1 lb. to 4 lb. of columbite per day. As the result of information published in the Geological Survey Department's Annual Report for 1949, there has been a revival of interest in the possibility of working these deposits. Two companies have recently been formed locally for this purpose, and it is possible that one of them may receive assistance from the U.S. Government.

LOW-GRADE MANGANESE

Low-grade manganese ore has been discovered at a number of localities in the north-western part of British Guiana. The largest known deposit occurs near the old Tassawini gold mine, about 20 miles from the navigable portions of the Waini and Barama Rivers. Last year, the E.C.A. geologist and another geologist carried out a further investigation of the known deposits in the Barama River area.

The only known occurrence of uranium is the mineral euxenite, small specimens of which have been obtained in the Kanaku Mountains. The mineral is radioactive, and its age has been calculated from the relative percentages of contained uranium, thorium, and lead, as some 1,160,000,000 years. A brief survey of this occurrence was carried out in 1950.

Iron ore has been reported from various localities. Of possible commercial importance are enormous masses of concretionary ironstone discovered by E. E. Winter in a locality known as the Iron Mountain.

Large deposits of white sand are available in close proximity to navigable waterways and it has been suggested that they could be used for glass making. Seams of lignite also occur, but attempts to use this material locally have proved unsuccessful. Natural gas is occasionally encountered during the drilling of artesian wells in the Coastal Sedimentary series.

Aviation is playing an important rôle in the mineral development of British Guiana, particularly in inaccessible regions and where high forest growth obstructs geological and mineral investigations.

The Director of the Geological Survey in British Guiana acts as Geological Adviser to the whole of the British West Indies and his department seconds staff to work in the West Indies. One of the British Guiana geologists is at present seconded to the Leeward Islands. Jamaica has its own Geological Survey.

Recent work in British Guiana is summarized in a report by the Director of Colonial Geological Surveys, Dr. F. Dixey, C.M.G., O.B.E., which will be published in a forthcoming issue of *Colonial Geology and Mineral Resources*.

Shaft Sinking at San Manuel

By J. F. BUCHANAN

An example of American shaft sinking practice is given in the following article which is an abridgement of a paper presented by the author, who is mine superintendent of the Magma Copper Co., Superior, Arizona, at the 1951 Metal and Non-metallic Mineral Mining Convention held in Los Angeles, California, last October. The author describes drilling, blasting, mucking, timbering and water pumping operations as well as the method of ground support used but the feature of the article is the way in which these operations were conducted to reduce or minimise the universal difficulties of shaft sinking. Thus an interesting comparison can, in some respects, be made with the technique employed by the Anglo-Transvaal Consolidated Co. at the Virginia and Merriespruit Mines in the O.F.S. which were fairly described in an article appearing in *The Mining Journal* on February 8 last entitled, "Methods and Equipment for Circular Shaft Sinking at Virginia and Merriespruit Mines."

The Magma Copper Co. has sunk two shafts at San Manuel. No. 1 shaft is a four compartment shaft, ground supported by steel sets and lined with reinforced concrete. Its section requires a rock excavation of 9 ft. x 28 ft. or 252 cu. ft. and the shaft itself is 1,494 ft. deep. This shaft is located outside the area of subsidence in barren quartz monzonite and will be used for hoisting ore. The sinking hoist is a double drum clutched hoist driven by a 250 h.p. motor, the whole having a 15,000 lb. rope pull and hoisting speed of 900 ft. per minute. The fourth, or pump compartment, is serviced by a 100 h.p. single drum hoist with a speed of 300 ft. per minute. A shaft crew of six men per shift performs all necessary underground operations.

All drilling is with hand held Jackhammers of the 50 lb. class with alloy drill steel and detachable bits. The ground is blocky so that rounds averaged only 5 ft. Water encountered caused an alteration to the V-type round cut. Holes were loaded with 40 per cent straight gelatin and detonated with regular delay electric blasting caps.

MUCKING IN SUPPORTED GROUND

After the first 75 ft. of shaft, mucking was by a Riddell Mucker and counter weighted clam shell, the muck being hoisted in 37 cu. ft. buckets. The bucket dumps, one for each hoisting compartment, consisted of an underslung car moved in and out of the shaft by an air cylinder. Owing to the loose ground, steel sets were carried within six ft. of the bottom and only one divider could be left out. To muck inside the sets, the mucking track was shortened and set in the middle two compartments leaving the centre divider out below the mucker.

For ground support steel sets consisting of 25 lb. 6 in. and 10 in. W.F. members were hung on 6 ft. centres. These sets were blocked with 8 in. x 8 in. stringers which were removed before concreting, while enough lagging was placed behind the stringers to prevent sloughing. In general practice the shaft was sunk 48 to 60 ft. below the last concrete, when it was floored off 18 ft. above the bottom and the shaft was concreted back up to the bottom of the previous pour. Pours were made by the set, six ft., with an average of 27 yd. of concrete poured per set.

Forms used were steel lagging 14 in. wide and weighing 110 lb. each. They were placed inside the W.F. section of the shaft sets to give a smooth concrete lining behind the wall plates and end plates. Forms were stripped after a minimum of 16 hours and used again. The concrete was a 1:2:4 mix of cement, screened river sand and crushed rock fed to a mixer at the collar from a 30-ton batch plant. The concrete was dropped through an 8 in. pipe to the set above the pour, where the fall was broken by a 20 ft. sleeve of 10 in. pipe with a solid bottom. The concrete poured into a buggy, then was trammed and dumped into the forms.

PUMPS USED TO COMBAT WATER FLOW

While the shaft was dry San Manuel engineers vibrated in the forms. After water was encountered they did not vibrate as this caused more cement to be floated away. To pour in the water they drew the forms as watertight as possible to make the water overflow the forms, then dumped the concrete into the pool behind the form. As much as 400 g.p.m. would be pouring over a set of forms and carrying some cement and fines with it. This loss of cement was offset by an increase of 50 per cent in the cement.

The first 1,100 ft. of this shaft was sunk dry but at 1,100 ft. water was encountered and by 1,460 ft. the inflow was 900 g.p.m. On the 800 ft. level three 700 g.p.m.-4 stage centrifugal pumps, each driven by a 200 h.p. 2,300 volt 3,550 r.p.m. motor were installed complete with automatic controls. These pumps were fed from a clear water sump of 75,000 gal. capacity, with a positive head. Two settling sumps each of 16,000 gal. capacity and used alternately, were effective in clearing the water before it flowed by gravity to the clear water sump.

The first water encountered was handled by air powered sump pumps discharging into a 500 gall. portable tank located in No. 4 compartment and equipped with two 300 g.p.m. motor pumps which discharged into the settling sump on the 800 level. There were decided objections to this system. A small booster pump station was cut at 1,200 ft. depth.

Sinking below the 1,200 ft. level an eight-stage deep well type pump was installed, driven by a 75 h.p., 440 volt, 1,750 r.p.m. motor having a rated capacity of 500 g.p.m. at a 420 ft. head. This pump was connected to the 8 in. pump column by a 50 ft. length of 4½ in. high pressure hose. Power was transmitted to it by a 600 volt No. 2 portable cable. It was controlled by a manual switch connected to the starter on the 800 ft. level by a 110 volt cable. This arrangement was flexible, allowing the pump to be raised or lowered for blasting or mucking without any delay for breaking or making connections.

IMPROVISED WATER RINGS

Water falling for a distance of over 50 ft. and in quantities of 200 g.p.m. was overcome by forming water rings. The concrete lining between two sets was left out and a head board was placed around the lower set thus forming a ditch 18 in. x 12 in. around the perimeter of the shaft. A 300 g.p.m. motor pump was then set below the ring, fed by gravity from the ring and discharging into the sinker column. These rings were installed approximately 48 ft. apart.

The ring pumps made for better working conditions on the bottom and also kept down the load on sinkers. A sinker that will lift 500 g.p.m. of clear water 400 ft. drops off to about 350 g.p.m. of dirty water while mucking is in progress. To increase the capacity of the sinkers a one-inch air jet was inserted into the discharge column about 150 ft. below its discharge point. Wear on sinkers was not excessive when the abrasive materials pumped are considered. Forty-eight ft. of sinking and concreting was the average life of a sinker.

To summarize, there was sunk and concreted 1,338 ft. of shaft at the rate of 107 ft. per month, 3.56 ft. a day,

or .198 ft. per man shift during wet and dry sinking, and with times used for the cutting of stations not included in the figures.

THE TIMBERED No. 2 SHAFT

The No. 2 shaft, 2,064 ft. deep, is a three compartment timbered shaft requiring a rock excavation of 8 ft. x 21 ft. It was sunk through 710 ft. of Gila conglomerate above monzonite porphyry. It is an exploration shaft and the upper part will be lost soon after production starts. The first 400 ft. was sunk with a small air hoist and was hand mucked while the remainder was sunk with a 225 h.p. double drum clutched hoist with 15,000 lb. rope pull and a hoisting speed of 800 ft. per minute. A shaft crew of four men performed all necessary underground operations.

Drilling followed the same procedure as in No. 1 shaft with rounds averaging four feet only. A V-type cut was used throughout. In water long collar pipes of up to 2 ft. length were used to collar the holes, which were blasted in parallel or series-parallel with a 440 volt circuit. Regular electric delays and 40 per cent straight gelatin were used in all rounds. Mucking was performed mechanically in similar fashion to that of No. 1 shaft.

The upper 710 ft. of shaft presented no support problem and in the Gila conglomerate a 20 ft. untimbered sump could be safely kept. But in the porphyry section timber again had to be carried to within 5 ft. of the bottom. The ground was heavy enough so that with one divider left out to allow the use of the Riddell Mucker the 12 ft. span of wall plate would bend. To overcome this there was added a complete jacket set with 4 in. between plates allowed for squeeze, with any deflection then in the jacket plate rather than in the shaft plates. To facilitate mucking the jacket sets were kept below the regular sets.

Water was encountered in the Gila conglomerate at 300 ft. At the bottom of the Gila, at 710 ft. depth, the inflow was 300 g.p.m. and at 2,000 ft. it was 1,500 g.p.m. There was no regular increase, some strata were dry while others carried the water. The only pump available was a No. 7 Cameron that handled 60 g.p.m. and got down to 350 ft. depth. A small pump station was cut at 400 ft. depth and the sinker used below this level was identical to those used in No. 1 shaft.

At the bottom of the Gila the first water ring and motor pump were installed similar to the ring set up in No. 1 shaft. It is interesting to note that 3 per cent of the sinking time was spent in constructing water rings, and installing louver boards and ring pumps. Booster stations similar to the one on the 400 level were installed at the 800, 1,100, 1,300, 1,600 and 1,900 ft. depths, eventually meaning that pump equipment from the 400 and 1,100 ft. levels could be salvaged and used below.

To summarize, 2,068 ft. were sunk at the rate of 110.5 ft. per month, 3.68 ft. per day or .307 ft. per man shift. Best sinking times were, in No. 1 shaft, the two months when a footage of 310 ft. was sunk and concreted, and in No. 2 shaft the month when a sinkage of 138 ft. was accomplished.

Taconite Developments in the U.S.A.

Plans for the use of taconite, a low-grade iron ore with an Fe content of about 20 to 30 per cent, are progressing rapidly in the Lake Superior district to augment rapidly diminishing supplies of the rich ores of 50 per cent or more Fe content, states an article entitled "Trends," published in *Mining Engineering*, 3, 11, 934, 1951. The anonymous author recalls that the Reserve Mining Co. decided recently to proceed immediately with the construction of a 2,500,000 ton per year taconite beneficiating plant, to be completed in 1955, operations to begin late that year or early in 1956. The new plant will be located on the north shore of Lake Superior, about 55 miles east of Duluth, at Beaver Bay. It will be connected by a 47 mile railway with the company's mining property at Babbitt, Minnesota, on the eastern end of the Mesabi Range. A $75,000,000 contract has been awarded to a group of contractors for the construction of a railway and of a concentrating plant; for the installation of transmitting equipment and mining machinery.

It is estimated that more than 1½ billion tons of taconite, averaging 23 to 24 per cent iron, are in the holdings of the Reserve Mining Co.; this will produce 500,000,000 tons of high-grade iron-ore concentrate. To operate the above mentioned new plant at full capacity, the mining of 7,500,000 tons of taconite will be necessary. The ore will be reduced to less than 4 in. in size in a crushing plant located near the pit which is being opened at Babbitt. It will then be transported by rail to the Beaver Bay plant, where it will be reduced further to a powder of the fineness of cement.

Concentration will be by magnetic separation; next, the concentrate will be rolled into walnut-size pellets and baked into hard balls in a pelletizing furnace. These finished pellets will be shipped to steel plants in the lower lakes region from docks within a new harbour adjacent to the plant at Beaver Bay.

The result will be a tailor-made product of much more uniform composition and size than natural ore, and richer in iron units than any of the present ores of the Lake Superior district. These pellets will contain 64 per cent iron. Their cost, it is stated, will be competitive with other Lake Superior iron ores.

THE BABBITT PLANT

Moreover, one-section plant at Babbitt, with a capacity of 300,000 tons per year, is now being re-equipped. In this plant, beneficiation will be studied and developed to as near perfection as possible, while the construction of the larger plant is under way. The latter will be designed in multiples of the process which is now being developed at Babbitt; eight such sections will be included in the first phase of the construction with 32 sections contemplated for the eventual 10,000,000 ton plant.

The following steel companies are partners in the Reserve Mining Co.: Republic Steel Corporation, Armco Steel Corporation, and the National Steel Corporation. Other developers of taconite are the Erie Mining Co. and the Oliver Mining Co. The Erie Mining Co., which is owned jointly by Bethlehem Steel Corporation, Youngstown Sheet and Tube Co., Pickands Mather & Co., and Interlake Iron Corporation, has been mining taconites and making pellets in a 2,000 ton per day plant for nearly three years. Its plan for a commercial size plant (probably 2,500,000 ton also) have not yet been disclosed, though an announcement is expected shortly.

The Oliver Mining Co. has constructed a fine-ore agglomerating plant at Virginia, Minnesota, and is tackling the most difficult of the metallurgical problems connected with taconite—that of agglomeration. Sintering and nodulizing are also being studied. This plant is designed to produce 1,000,000 tons of egg-size nodules and sinter per year; it uses a 6 x 96 ft. sintering machine and a 12 x 350 ft. brick lined kiln. Information obtained from this plant will be used when the company begins large-scale taconite operations.

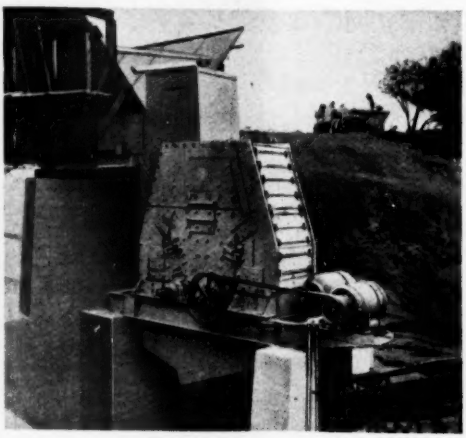
MACHINERY AND EQUIPMENT

The Kessler-Fairleede Double Impeller Breaker

This new type of breaker, built by Fairleede Engineering Ltd., is claimed by its makers to represent the first really new method of stone and gravel reduction to be introduced in over 30 years. This machine, which is stated to have many advantages as compared with the jaw or gyratory types of breakers, is successfully being used for the reduction of stone, gravel, clay, concrete aggregate and many other materials that tend to jam or clog other types of machines. In fact, over 350 Kessler-Fairleede breakers are now in operation in the United States, *e.g.*, in mines, quarries, cement works, and in connection with hydro-electric schemes, the erection of factories, and in road construction.

Material fed into the breaker—which can be used both for primary or secondary crushing—falls directly on to the two impellers, revolving at up to 1,250 r.p.m. Three bars in each impeller provide the first impact, throwing the fragments on to the steel breaker bars for the second impact. The fragments then hurtle around the breaker, colliding with each other and new material entering the breaker, producing a clean, cubical product with a low percentage of dust.

The large capacity of this machine is stated to be the main point of interest; for instance, Model 3030 will reduce run of



The Kessler-Fairleede Double Impeller Breaker

material 30 in. x 30 in. in area to minus 1½ in. showing the largest ratio of any crushing machine, in this case having a ratio of 20 : 1.

According to the makers, the use of this breaker will generally result in a saving in the cost of installation, and the running cost can be as low as ½ h.p. per ton per hour. Moreover, since such a large reduction ratio is accomplished by one machine, great savings can be made in the use of accessory equipment, and plant maintenance can be kept to a minimum.

There are only two moving parts in the breaker (the impellers), both easily lubricated by hand guns, showing yet a further saving upon other types of breakers using high pressure lubricating systems. All wearing parts and liners are easily replaceable. It can be used in open or closed circuits and its light weight, combined with great strength, enables it to be used stationary, skid-mounted or trailer-mounted. An additional advantage of this breaker is that it can be used in almost inaccessible places, for it can be dismantled, if necessary.

In its construction, fabricated steel is used throughout, combining great strength with clean lines and showing a saving in weight. The breaker is built to exacting specifications and the liner plates are of high-grade manganese steel and are easily replaceable. Small doors provide access to impeller bars and breaker bar adjustment. A simple screw device provides quick, easy adjustment horizontally.

Three separate adjustments are possible: (1) Impeller speeds —the greater the speed the greater the reduction; (2) End breaker bars can be moved towards or away from the impellers; (3) Adjustable bars above the impeller can be moved in a similar manner. Mounted above each adjustable bar is a shear pin safety release—guarding against damage by tramp iron.

The impellers are precision machined upon special shafts, mounted in heavy duty anti-friction bearings; they are fitted with reversible impeller bars made from chrome or manganese alloys, each fitted when necessary with renewable tips.

T.I. Aluminium Introduces New System of Quality Control

A new system of metallurgical quality control, introduced into this country for the first time by T. I. Aluminium Ltd., enables analytical work that would normally take six chemists one day, to be carried out by two men in one hour.

The system, which is also applicable to other metal producing industries, is claimed to be the most revolutionary advance yet made in rapid and accurate control of metal composition. In fact, it makes it possible to complete an accurate analysis for up to thirteen elements in less than four minutes.

In the production of high strength, and other special aluminium alloys, the alloying elements must be controlled to close limits. Because of the time factor, it has previously been necessary to verify the composition after the metal was cast. If the metal failed to meet specification requirements, it was rejected for re-melting, with consequent production hold-up.

With the method now in operation at the T. I. Aluminium Ltd. foundry at The South Wales Aluminium Co., Ltd., Resolven, near Neath, the speed with which results are obtained permits the checking of the metal in the furnace before it is cast and any corrections necessary can be made immediately.

In operation, therefore, the exact analysis of every slab or billet cast is known prior to casting, and the continuity of product quality and smoother production flow assured in the rolling and extrusion mills, is of a standard impossible to attain by the methods hitherto practised in the industry.

The new technique is based on a complex apparatus known as the A.R.L. Production Control Quantometer, which is an electronically operated form of direct-reading spectrograph. As one of the essentials in the successful use of the instrument is the maintaining of a constant and delicate optical focus, it is housed in a special laboratory sited in a corner of the foundry, under controlled conditions of temperature and humidity. The three components of the apparatus are a Source Unit for exciting an arc, or spark, from the metal to be analysed; a Spectrometer for measuring the relative intensities of the light wave lengths existing in the arc; and a Recording Console giving direct interpretation of the results.

Test samples, cast at the furnace side, undergo a high speed machining operation to provide a pencil shaped or flat plate specimen, which is inserted in the source unit. An arc is struck from the metal surface and the light is optically directed into the Spectrometer, where the relative intensities of the component light wave-lengths (or spectrum lines), are measured by photo-multiplier valves. These valves charge condensers, which, in turn, operate through an amplifier to feed the high speed recorder, from which results are read and signalled to the foundry control centre.

In addition to routine melt control, the Production Control Quantometer has other applications in light alloy manufacture. Rapid check analysis is now feasible on the process scrap arising from the rolling and extrusion processes, which is fed back to the foundry for incorporation with virgin metals and then re-melted for casting into fresh ingots and billets. In the past, indifferent segregation of arisings from different alloys, which all had similar appearance, was a not infrequent source of contamination in a finished melt.

The new system, which is at present worked only by T. I. Aluminium Ltd., will no doubt be widely adopted, as it presents to the metallurgical industries an entirely new conception of quality control.

METALS, MINERALS AND ALLOYS

South Africa is having to tighten up on its non-ferrous metal controls. From May 1, all dealers and manufacturers of copper, nickel, zinc, cobalt, molybdenum, and tungsten will require permission to sell or use these metals. The use of copper and zinc will be forbidden in a large number of goods after June 1. South Africa expects that her allocation of 12,400 tons of zinc by I.M.C. will be scarcely more than half her needs of 23,000 tons.

The U.S. government has signed a nine-year contract with Falconbridge Nickel Mines for the purchase of a total of 25,000 s.tons of nickel and 750 s.tons of cobalt. In addition, the government has an option to purchase 12,500 s.tons of copper and an additional 12,500 s.tons of nickel. The company has agreed to offer to the American market not less than 40 per cent of its entire output of nickel and cobalt until the end of 1956. The basic price for nickel will be 56.66c. per lb. f.o.b. Kristiansand, but this can be varied according to market fluctuations, and the price for the cobalt will be either $1.80 per lb. or the market quotation, whichever is the higher.

COPPER.—The American motor manufacturers have not been slow in trying to demonstrate that they are really converted to the belief that big swings in the price of some commodities make little difference to the cost of the finished article. As Chile is reported to be wanting to sell the free 20 per cent of its output at 33¼c. per lb., the motor manufacturers have said that they are willing to take up some of this offer. Trade circles consider that copper is so scarce, that a possibility exists of Chile being able to hold America to ransom for the whole of her quota, and the president of Kennecott Copper anticipates increases in the price of copper in the years ahead. On the other hand, N.P.A. is asking the motor manufacturers to state what quantities of steel, copper and aluminium they require to make various numbers of cars. The reason given for wanting this information is that the Defence Department is making an additional allotment of 15,000 s.tons of aluminium, and 12,500 s.tons of copper to civilian industries. The bonus is possible because of the return of surplus metal by the military authorities and because some manufacturers were not meeting their production targets.

The U.S. Government has signed the second of its high-price contracts; as reported in the issue of February 1, the company is the White Pine Copper Company, a subsidiary of the Copper Range Company, and the price is 25½c. per lb. The amount set out in the contract is 243,750 tons.

LEAD.—Although no official confirmation can be obtained of the rumoured deal involving the sale of a further 20,000 tons of lead to the U.S., the refusal of the British Ministry of Materials to deny the report must be taken as significant. At first sight it seems strange that this further transfer should be made now the market is easing. As expected, N.P.A. has formally relaxed its control on the use of lead. Mr. E. Vogelsang, director of N.P.A. tin, lead and zinc division, has said that the size of recent foreign lead offerings indicates that imports in 1952 into the U.S. will "far exceed" those of 1951. He thought that the domestic supply of lead "at least during the next few months" will be adequate to meet both defence requirements and civilian orders. The relaxations are intended to rebuild stocks in the hands of consumers. Mr. Vogelsang's statement could be taken to mean that the present easing in the position might be temporary and that after "the next few months" have passed, conditions might become more difficult. If the quotation given can bear interpretation, the U.S. authorities would not be unwise in making large deals at a price which seems favourable to the producers.

After the sharp fall reported last week in the price of Mexican lead, some slight recovery has since been seen. At 18.42c. per lb. f.o.b. Monterey, the price compares with 18.38c. a week earlier.

The January figures of refined lead published by A.B.M.S., all point in the direction of an easing of the position. Production in the U.S. rose by about 7,000 tons to 43,746 tons; shipments to domestic consumers increased from 37,274 tons in December to 40,390 tons; and stocks held by refiners at the end of the month grew from 25,339 tons to 28,578 tons.

TIN.—The Indonesian ambassador to Washington gave what might be taken as a hint of one reason—apart from the Government crisis in Djakarta—for delay in reaching an agreement between the Indonesians and the Americans on tin. He said that the price should be "as high as possible" though he declined to name a figure which would be considered satisfactory. R.F.C. has offered 121½c. per lb. but the Indonesians are reported to have asked in the earlier stages for slightly more than 125c. per lb. As a consequence of the lapsing of the U.S.-Indonesian tin contract, no shipments were made in January. All the 2,344 tons of tin-in-ore shipped from Indonesia in that month were destined for Holland. In December, 2,096 tons went to Holland, and the remaining 835 tons to the U.S.

The U.K. aluminium-tin-steel deal, the talks between the U.S. and the Indonesians and the discussions between R.F.C. negotiators and a representative of Belgian interests are making the Bolivians desirous of resuming talks. No Bolivian tin ore has been shipped to the U.S. since last June, and this is no small factor in the changed attitude. The Bolivian ambassador to Washington has been making enquiries for a basis of starting new negotiations. This has not prevented the Bolivian ambassador to the Argentine asking that country to support the claim for higher prices for tin exports. The note is reported to have dubbed the U.S. attitude as a "typical case of economic aggression." The note goes on, according to the Buenos Aires report, to assert that the U.S. is obstinately clinging to $1.12 as the sole price that can be paid, although the note avers that the U.S. is to pay the U.K. $1.22. Actually the delivered price is $1.21½.

Of the 4,550 tons of tin shipped from Malaya in February, 1,598 tons were sent to the U.K., 1,744 tons to Europe and 425 tons to the U.S.

ZINC.—The American allocations of zinc for March are 10 per cent bigger than those of February. The present tightness in the supplies of Prime Western is expected to continue for some time, but the slackness in special high grade zinc will probably be lessened by any increase in the supply of copper and aluminium to the motor industry.

The British situation continues unchanged. The apparent availability of zinc is really a consequence of the shortage of steel and the severe restrictions placed on the use of zinc. Industry is hoping that some modifications will be made in the prohibitions order, but the chances cannot be rated very high, in view of the need to restrict imports and the demands of rearmament.

ANTIMONY.—The U.K. price of antimony has been lowered by £25 to £352 10s. per ton of 99 per cent metal, delivered U.K. buyer. The ore price is also lower at 40s. to 45s. per ton c.i.f. for 60 per cent grade.

CHROMIUM.—A new chromium mine has been set up in the Turkish district of Mugla. So far, few details have been released; its size and quality are, as yet, unknown but the report from Ankara states that the mine is workable.

QUICKSILVER.—Two successive increases in recent days have brought the U.S. price for domestic quicksilver to $207/$210 compared with $202/$205 last week.

WOLFRAM.—Under a trade agreement signed recently between Portugal and France, the latter is to obtain 600 tons of wolfram ore.

GOLD.—The output of gold from the Transvaal and the Orange Free State in January amounted to 972,906 f.oz., as compared with 948,947 f.oz. in December. The January total was made up as follows: the December figures are in brackets: Rand, 947,487 f.oz. (925,058); Transvaal outside districts, 13,041 (13,261), and O.F.S. 12,378 (10,628).

The Western Australian output in December was 49,839 f.oz.

The London Metal Market

(From Our Metal Exchange Correspondent)

During the last week there have been no fresh developments in the negotiations between the Americans and the Indonesians, and as buyers in Europe have maintained their policy of only purchasing their immediate requirements the price has shown very little change on the London Metal Exchange.

Since last week the free copper market has commenced to follow the downward tendency shown by lead and zinc, and although the general price level for electrolytic copper with payment in dollars is still slightly above the 40c. per lb. mark, a small tonnage of sterling copper has changed hands at around the £400 per ton mark, which is some £50 per ton below the last reported deal.

There is little business in zinc, although the premium for high grade metal has further diminished to about £35 per ton.

The price of lead remains unchanged in spite of a report that the U.K. Government are negotiating with the U.S. Government for a sale of a further 20,000 tons of metal to be delivered out of the former's outstanding purchases from Canada and Australia.

On Thursday the official close on the tin market was: Settlement price £980, Cash Buyers £979, Sellers £980; Three months' Buyers £979, Sellers £980. In the afternoon the market was steady. Turnover for the day was 80 tons. Approximate turnover for the week was 485 tons.

The Eastern price on Thursday morning was equivalent to £996 10s. per ton, c.i.f. Europe.

Iron and Steel

The steel industry's performance in the first two months of this year has been most disappointing. The current rate of production is well below the target figure for the year, and fears are now openly expressed that it will be impossible to provide all the material allocated for the first Period which terminates on March 31.

The position may undergo some slight improvement in the second Period. Possibly more scrap, and certainly more pig iron will be placed at the disposal of the steel makers, but the swollen demand for steel cannot be fully satisfied from home sources, and as only small shipments from U.S.A. are expected until the second half of the year, conditions of acute stringency seem likely to prevail during the second Period which extends from April to the end of June.

Under these circumstances the advance in the controlled maximum prices which became effective on February 27 has not visibly affected the demand. The rise in pig iron prices ranges from 14s. 6d. per ton in the case of basic and haematite iron to 30s. 9d. for No. 3 foundry iron in the Birmingham area and 31s. 6d. Middlesbrough. Crown iron is up £3 per ton, the advances for sheet bars and soft basic billets amount to £3 7s. 6d. and £3 13s. respectively and finished steel prices are increased by £4 1s. 6d. in the case of heavy sections and £4 7s. 6d. for plates.

Owing to the limitations of supply, export quotas as well as home deliveries have had to be met. Unemployment has not yet developed to any serious extent amongst the steel using industries, but the outlook in this direction is by no means bright.

The shortage of steel sheets is particularly acute and since Defence orders are absorbing larger tonnages, sheet-makers are powerless to respond to appeals for supplies for less essential purposes.

Happily the persistent efforts of the British Iron & Steel Corporation to obtain increased tonnages of sheet-bars and billets from Western Europe have met with some success. Shipments coming to hand from Belgium and France during the past few weeks have been on a rather better scale. Deliveries, however, are still heavily in arrears and a further acceleration would be a welcome development, as the re-rolling mills are still working irregularly owing to the lack of material. Latest reports from Germany indicate that steel scrap collection in January and February has exceeded expectations, and under the sliding scale agreement, the Anglo-U.S. allocation for April will be increased.

MARCH 7 PRICES

COPPER

Electrolytic ... ... £227 0 0 d/d

TIN

(See our London Metal Exchange report for Thursday's prices)

LEAD

Soft foreign, duty paid .. .. £170 0 0 d/d
Soft empire, including secondary lead ... £170 0 0 d/d
English lead ... . £171 10 0 d/d

ZINC

G.O.B. spelter, foreign, duty paid ... £190 0 0 d/d
G.O.B. spelter, domestic . ... £190 0 0 d/d
Electrolytic and refined zinc ... ... £194 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over ... ... £340 per ton
Crude (70%) ... ... £275 per ton
Ore (60% basis) ... ... 40s./45s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) ... ... £454 per ton

OTHER METALS

Aluminium, £148 per ton.
Bismuth, 28s. lb.
Cadmium, 18s. 9d. lb.
Chromium, 6s. 3d. lb.
Cobalt, 20s. lb.
Gold, 248s. f.oz.
Iridium, £65 oz. nom.
Magnesium, 2s. 10½d. lb.
Osmiridium, £35 oz. nom.
Osmium, £70 oz. nom.
Palladium, £8 10s. oz.
Platinum (scrap), £33.
Platinum, £27/33 5s. nom.
Rhodium, £45 oz.
Ruthenium, £30 oz.
Quicksilver, £73 10s./£74 ex-warehouse.
Selenium, 25s. nom. per lb.
Silver (bar), 77d. f.oz. spot and forward.
Tellurium, 19s. lb.

ORES, ALLOYS, ETC.

Bismuth ... ... 65% 18s. 3d. lb. c.i.f.
60% 17s. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (lumpy) £13 per ton c.i.f.
,, ,, (concentrates) £13 per ton c.i.f.
,, ,, Refractory £12 12s. per ton c.i.f.
Baluchistan Metallurgical ... £14 16s. per ton c.i.f.
Magnesite, ground calcined ... £26 - £27 d/d
Magnesite, Raw ... ... £10 - £11 d/d
Molybdenite (85% basis) ... 103s. 1½d. per unit c.i.f.
Wolfram (65%), U.K. ... 485s. nom. c.i.f.
Tungsten Metal Powder (for steel manufacture) ... 35s. nom. per lb. (home)
Ferro-tungsten ... ... 33s. nom. per lb. (home)
Carbide, 4-cwt. lots ... ... £30 3s. 9d. d/d per ton
Ferro-manganese, home ... £43 15s. 2d. per ton
Brass Wire ... ... 2s. 7½d. per lb. basis.
Brass Tubes, solid drawn ... 2s. 1d. per lb. basis.

U.K. METAL & MINERAL IMPORTS—JAN.

	Units	Jan. 1952	Jan. 1951	Jan.-Dec. 1951	Increase or Decrease in Jan.'52 over Jan. '51
Non-ferrous metals and manufactures:					
Aluminium and alloys...	Cwt.	246,785	138,916	3,548,605	+ 107,869
Bismuth*	Lb.	33,529	30,137	557,375	+ 3,392
Cadmium	Lb.	124,163	91,827	1,492,129	+ 32,336
Cobalt and alloys	Lb.	408,507	447,087	3,479,767	— 38,580
Copper:					
Electrolytic	Tons	18,926	20,548	219,181	— 1,622
Other.....	Tons	8,399	11,540	136,470	— 3,141
Lead	Tons	25,723	10,733	174,823	+ 14,990
Mercury	Lb.	45,612	83,612	1,427,304	— 38,000
Nickel	Cwt.	18,116	5,592	112,344	+ 12,524
Tin	Tons	713	380	10,912	+ 333
Zinc	Tons	18,308	11,235	119,761	+ 7,073
Ores and concentrates:					
Antimony ore and conc.	Tons	910	3,041	26,415	— 2,131
Bauxite	Tons	35,045	23,732	343,701	+ 11,313
Chromium ore	Tons	20,117	7,731	132,287	+ 12,386
Iron pyrites...†	Tons	13,037	17,732	347,558	— 4,695
Manganese ore.....	Tons	40,587	65,729	386,085	— 25,142
Molybdenum ore.....	Cwt.	5,183	7,761	62,458	— 2,578
Nickel ore, conc. & matte	Tons	934	4,543	35,354	— 3,609
Tin ore and conc.....	Tons	4,702	2,946	50,773	+ 1,756
Titanium:					
Ilmenite	Tons	5,751	16,292	78,255	— 10,541
Other sorts	Tons	789	526	9,411	+ 263
Tungsten ore	Tons	198	260	4,760	— 62
Zinc ore and conc.	Tons	21,350	11,717	180,533	+ 9,633
Non-metalliferous mining products:					
Asbestos	Tons	7,711	6,496	122,392	+ 1,215
Magnesite.....	Tons	2,876	1,812	22,969	+ 1,064
Sulphur.....	Tons	57,018	29,223	380,423	+ 27,795

*Excluding bismuth alloys.
†Including cupreous iron pyrites

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Stock markets finished the week in a better frame of mind than they began it. The latest figures from the European Payments Union created rather more confidence in the £. Gilt-edged and industrial issues mainly finished the turn higher.

Finance houses, although patchy, recorded definite improvements, and falls, where they occurred, were modest. African and European again declared a 2s. 6d. dividend per 10s. unit, but the profit after taxation was higher at £737,531 against £593,620 last year. The board is clearly pursuing a conservative policy in view of its heavy financial commitments.

The Anglo-American Corporation announced that existing ordinary shareholders would be offered one new share for every ten held at a price to be determined later. A meeting to authorize the increase in capital will be held on March 27. The money is for development in the O.F.S. and Far West Rand.

Kaffirs generally were easier. There was some profit-taking following the marked improvement last week and the February Rand returns were poor, showing decreased profits and increased working costs. These are directly attributable to the shorter working month and do not necessarily give a fair picture of the general trend. The outstanding feature was the first return from West Driefontein. Some circles had expected a substantial loss for the first working month but in spite of the fact that the new plant is still absorbing gold the mine was able to show a working profit of £3,722. This is highly satisfactory.

O.F.S. shares showed little change. Welkom quickly lost early gains when a report was published of an explosion in the mine in which 14 Africans were killed and a European seriously injured. The company's February returns showed a reduced loss. St. Helena went ex rights to the new issue of shares at 16s. each. The company's February return shows an increased profit and this was well received by the market.

Consolidated Murchison fell on the reduction in the price of antimony by £25 and there was some selling of platinum shares by weak holders in Johannesburg.

West African gold issues, while mostly firmer, displayed little enthusiasm. It is clear that large investors distrust the political situation and are not currently prepared to venture substantial sums of money in this market.

Ashanti Goldfields estimated total profit for February is £67,724 as opposed to £92,488 in January. The management report difficulty in maintaining normal grade of ore mined.

In Western Australia the announcement of a dividend of 6d. a share from Gold Mines of Kalgoorlie caused grave disappointment and the price fell heavily. This affected other issues in this section and served to underline the growing financial difficulties of this field.

Diamonds eased with the exception of De Beers which hardened on reports of talks between Mr. Oppenheimer and Dr. Williamson. The presumed purpose of them is to close the present rift in sales policy between the two interests.

Base metal shares generally tended to be better than last week, but coppers, after an initial recovery, fell away on reports of impending difficulties with African labour on the Rhodesian belt. The trouble is believed to be due to agitation against the proposed Central African Federation shortly to be debated in the House of Commons and also to the demand by local unions for a closed shop policy. This is reported to have been rejected by the companies. While the dollar metal situation is easier, sterling copper is still in short supply. The Indian Copper Company announced its intention to emigrate and will henceforth be controlled by a Board of Directors in India.

Lead/zinc shares where changed were mostly better, particularly Barriers. There were rumours of a new deal in the metal by the U.K. and U.S. with a prospect of another bulk sale by the former.

Following the improvement on Wall Street, dollar shares hardened and useful gains were recorded by Dome and International Nickel. U.S. production figures have stabilized in the past two months and this fact has brought about renewed confidence in the immediate outlook.

FINANCE	Price Mar. 5	+ or − on week
African & European	3½	+ ½
Anglo American Corpn.	7½	− ⅛
Anglo-French	20/7½	−7½d
Anglo Transvaal Consol.	37/6	
Camp Bird	12/4½	
Central Mining (£1 shrs.)	40/7½	+1/3
Consolidated Goldfields	52/6	+2/6
Consol. Mines Selection	33/9	+1/3
East Rand Consols	3/7½	+3d
General Mining	4⅝	+ ⅛
H.E. Prop.	35/-	−1/3
Henderson's Transvaal	13/6	−9d
Johnnies	3⅜	+ ⅛
Rand Mines	5¾	+ ⅛
Rand Selection	43/9	
Union Corporation	9	− ⅛
Vereeniging Estates	4⅛	
Writs	35/-	−1/10½
West Wits	49/4½	+7½d
RAND GOLD		
Blyvoors	43/-	−9d
Brakpan	19/6	−9d
City Deep	43/9	−7½d
Consol. Main Reef	43/9	
Crown	3¼	− ⅛
Daggas	3¼	− ⅛
Dominion Reefs	2/7½	−1½d
Doornfontein	27/9	−7½d
Durban Deep	3⅜	+ ⅛
E. Daggas	23/1½	−7½d
E. Geduld ... (4/- units)	48/1½	+7½d
E. Rand Props.	3⅜	
Geduld	6⅞	+ ⅛
Grootvlei	36/-	+3d
Libanon	16/9	−6d
Luipaards Vlei	20/6	+6d
Marievale	23/-	−3d
Modderfontein B	5/3	−1½d
Modderfontein East	31/3	
New Kleinfontein	33/9	−1/3
New Pioneer	17/3	
Randfontein	22/3	−9d
Robinson Deep	13/9	−3d
Rose Deep	34/4½	−7½d
Simmer & Jack	7/-	−3d
Springs	9/6	−10½d
Sub Nigel	2⅛	
Van Dyk	14/6	−6d
Venterspost	25/7½	+4½d
Vlakfontein	18/3	−9d
Vogelstruisbult	28/-	−6d
West Driefontein	6⅜	− ⅛
W. Rand Consolidated	50/-	−1/10½
Western Reefs	43/9	−1/3
O.F.S.		
Alpha F.S.A.	7/6	
Blinkpoort	20/7½	+7½d
Central Mining F.S.	4/-XR	
Freddies	9/-	−1½d
Freddies N.	8/-	−3d
Freddies S.	9/-	−3d
F.S. Geduld	3⅛	+ ⅛
Geoffries	22/-	
Harmony	19/6XR	−6d
Lydenburg Estates	11/3	+3d
Middle Wits	19/9	−3d
Ofsits	45/7½	−1/3
President Brand	17/6	
President Steyn	16/-	+6d
St. Helena	18/3XR	−2/9
U.F.S.C. & G.	7/9	
Virginia Deb.	7/3	
Virginia Ord.	11/-	−9d
Welkom	33/9	
Western Holdings (New)	3⅛	+ ⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/10½	+1½d
Ariston	6/7½	+1½d
Ashanti	24/9	+1½d
Bibiani	8/3	+1½d
Bremang	3/-	+3d
G.C. Main Reef	3/3	
G.C. Selection Trust	7/6	+3d
Konongo	3/-	+1½d
Kwahu	4/6	+6d
London & African Mng.	1/9	−1½d
Lyndhurst Deep	1/4½	+3d
Marlu	1/10½	+1½d
Nanwa	5d	
Taquah & Abosso	5/3	+3d
AUSTRALIAN GOLD		
Boulder Perseverance	2/10½	+1½d
Gold Mines of Kalgoorlie	10/9	+1/3
Great Boulder Prop.	6/3	−3d
Great Western Consol.	5/9	
Lake View and Star	18/7½	−1½d
Mount Morgan	17/6XD	+6d
North Kalgurli	16/-	+3d
Paringa	6d	
Sons of Gwalia	10/9	
South Kalgurli	9/-	−3d
Western Mining	7/6	−3d
Wiluna	5/9	
MISCELLANEOUS GOLD		
Cam and Motor	40/-	
Champion Reef	7/9	
Falcon Mines	9/3	+3d
Globe & Phoenix	25/-	+1/-
MISCELLANEOUS GOLD (contd)		
G.F. Rhodesian	7/9	+3d
London & Rhodesian	5/6	
Motapa	2/-	−3d
Mysore	4/7½	−1½d
New Guinea	1/6	
Nundydroog	5/9	
Ooregum	2/10½	
Oroville	12/3XD	
St. John d'El Rey	32/6	
Zams	39/3XD	−1/6
DIAMONDS		
Anglo American Inv.	4½XD	
Casts	33/3	−9d
Cons. Diam. of S.W.A.	4¼	− ⅛
De Beers Defd. Bearer	74/9	+2/6
De Beers Pfd. Bearer	14⅜	
COPPER		
Chartered	59/6	−3/6
Indian Copper	4/1½	−3d
Messina	4¼XR	− ⅛
Nchanga	7⅛	− ⅛
Rhod. Anglo-American	59/9	−1/9
Rhodesian Selection	18/3	−1½d
Rhokana	21⅞	− ⅛
Rio Tinto	22⅛	
Roan Antelope	13/-	−7½d
Selection Trust	43/3	−6d
Tanks	59/6	−3/-
Tharsis Sulphur Br.	50/-	
TIN (Eastern)		
Anglo-Burma	2/9	
Ayer Hitam	28/-	−1½d
Bangrin	9/9	−1½d
Gopeng	13/3XD	−6d
Hongkong	9/3	+3d
Ipoh	24/4½	−1/1½
Kamunting	11/1½	−4½d
Kepong Dredging	8/9	−6d
Kinta Tin Mines	16/6	−9d
Kramat Pulai	5/-	
Malayan Dredging	22/3	−6d
Pahang	15/9	+3d
Pengkalen	10/6XD	
Petaling	15/4½	−1/1½
Rambutan	15/-	
Siamese Tin	22/4½	−4½d
Southern Kinta	15/6	−3d
S. Malayan	24/6	−2/-
S. Tronoh	19/9	−3d
Sungei Kinta	20/-XD	
Tekka Taiping	9/3	−3d
Tronoh	25/9	−8d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	10/3	+1½d
Beralt Tin	22/-	−6d
Bisichi	4/-	
British Tin Inv.	16/10XD	−5d
Ex-Lands Nigeria	5/9	−1½d
Geevor Tin	15/1½	−10½d
Gold & Base Metal	4/4½	+1½d
Jantar Nigeria	6/6	−6d
Jos Tin Area	11/3	+3d
Kaduna Prospectors	4/-	−3d
Kaduna Syndicate	5/6	−1½d
London Tin	5/9	−3d
Ribon Valley	1/1½	−1½d
United Tin	2/9	−1½d
SILVER, LEAD, ZINC		
Broken Hill South	48/1½	+1/10½
Burma Corporation	3/3	
Consol. Zinc	28/6	+9d
Lake George	19/6	−1/6
Mount Isa	37/6	+9d
New Broken Hill	28/3	+3d
North Broken Hill	63/9	
Rhodesian Broken Hill	18/6	+3d
San Francisco Mines	31/9	−3d
Trepca	3/4½	
MISCELLANEOUS BASE METALS & COAL		
Amal. Collieries of S.A.	47/6	−1/3
Associated Manganese	43/9	−1/6
Chinese Engineering	3/9	
C.P. Manganese	48/6	−10½d
Natal Navigation	3⅜	− ⅛
Wankie	17/-	−6d
Witbank Colliery	2⅛	− ⅛
CANADIAN MINES		
Dome	$33	+$3½
Hudson Bay Mining	$116	
International Nickel	$83½	+$3½
Mining Corpn. of Canada	£5⅛	+ ⅛
Noranda	$143	+$1
Quemont	£8	
OIL		
Anglo-Iranian	5⅜	+ ⅛
Apex	48/1½	
Attock	24/4½	+1/3
Burmah	82/6	+7½d
Canadian Eagle Bearer	30/9	−9d
Mexican Eagle	23/9	+6d
Shell	4⅜	+ ⅛
Trinidad Leasehold	31/6	+1/-
T.P.D.	29/9	+1/7½
Ultramar	32/9	+10½d

COMPANY NEWS AND VIEWS

"Zams" Satisfactory Record

The Zambesia Exploring Co., which has always been identified with Tanganyika Concessions, forged a further link in its liason when that company's reorganization came about in 1950. Arising from this scheme, the Zambesia company formed a wholly-owned subsidiary—the Zambesia Investment Company—to take over its "reconstructed" holdings in Tanganyika Concessions as a fixed investment. It also co-operated with "Tanks" in the formation of Tanganyika Holdings (in which it has a 50 per cent interest), and to which it transferred its East African group of investments comprising Kentan Gold, Geita, Rhodesia-Katanga, Uruwira Minerals, etc.

The annual report for 1951 of Zambesia Exploring Company gives the first full year's account of the effect of the previous year's changes. The parent Company's and the subsidiary's results are presented separately. The former's revenue was slightly down at £177,806 but the profit, after taxation and all charges, amounted to £91,609 against £78,533. The distribution was increased from 13 to 20 per cent (including 10 per cent bonus) and the balance carried forward was £96,220. Profit of the subsidiary after tax was £24,043 which was carried forward. Although it earned £50,271 on its "Tank" investment, no distribution was made. Neither was there one from Tanganyika Holdings which reported a profit before taxation of £7,312.

The Zambesia Exploring Company's fixed assets consist of properties in Africa, its investment in the wholly-owned subsidiary company and 20,000 shares in Tanganyika Holdings, together with amounts due on loan account—all standing in the balance sheet at £789,881. Current assets include quoted stocks and shares at cost, £372,549, their market value at December 31, 1951, being £633,152. Loans and debtors figure at £214,497 and cash £165,498. The Chairman's statement, which accompanies the Report, reviews the Company's portfolio. The Kansanshi mine, belonging to Rhodesia-Katanga, is being explored by new interests and a deep drilling programme initiated. In Tanganyika, the Geita mine under the technical administration of the Gold Fields, is making progress and an improvement in milling is being seen. As regards Uruwira Minerals, a production mill to deal with 1,000 tons of ore a day is being installed and current expenditure is met by sale of concentrates from the pilot plant. Ore reserves are estimated at 2,370,000 tons of an average metal content of 3.8 per cent lead, 0.8 per cent copper, 118 grams silver and 1.9 grams of gold per ton.

Dalny Shows Profit over First 10 Months

Until February of last year, Falcon Mines, in which Rhodesian Corporation has a substantial interest, was almost wholly dependent for its revenue on its Sunace and Bay Horse Mines. Since February, however, profits have been earned by its Dalny mine which was brought to the production stage in December, 1950 when a small milling plant was commissioned pending the completion of the permanent reduction works.

During its first 10 months' operations ended September 30, 1951, Dalny crushed 28,070 tons yielding 4,365 oz. gold, equivalent to a recovery grade of 3.11 dwt. per ton. Working profit for the period was £6,398 which included £161 received from sales of gold at premium prices. The ore reserve position is good, total tonnage at the end of September being 483,000 tons of an average value of 4.2 dwt. over 106 in., compared with 455,000 tons averaging 4.2 dwt. over 103 in. in the preceding year.

Operations during the 12 months ended September 30, 1951, at the Sunace and Bay Horse mines continued satisfactory although production at Sunace was adversely affected for 4½ months by the temporary closing down of the cyanide section of the mine's reduction plant, with the result that working profit declined from £45,379 to £37,719. Operations at Bay Horse continued steadily and working profit amounted to £7,329 compared with £6,687 in the previous year and with £4,986 in 1949.

The profit and loss account of Falcon Mines for the year ended September 30, summarised below, calls for little comment. No tax liabilities were incurred as these were offset against expenditure at the Dalny Mine which during the year totalled £243,000 (£139,280). Of this amount, £174,081 was spent on the main reduction plant.

Year to Sept. 30	*Mining Profit*	*Gross Revenue*	*Expenses*	*Net Profit*	*To Reserve*	*Carry Forward*
	£	£	£	£	£	£
1950	52,202	61,027	9,263*	51,764	50,000	63,537
1951	51,565	58,346	8,209	50,137	50,000	63,674

* Includes loss on sale of shares of £195.

The annual meeting will be held in Bulawayo, Southern Rhodesia, on March 21. Mr. E. B. Popenfus is chairman.

Barrow Hepburn & Gale

Group trading profits of Barrow Hepburn & Gale, the well known tanners, leather manufacturers and merchants, for the 52 weeks ended December 29, 1951, amounted to £720,940 against £1,277,587, a decrease of £556,647. This steep decline in earnings was due to the sharp break in the prices of hides, skins and leather which began in May last and continued throughout the year. Nevertheless, the company is recommending a final dividend of 15 per cent, making, with the interim of 10 per cent, a total of 25 per cent for the year on the ordinary share capital of £400,000. This is the same total distributed in 1950 but in that year the interim dividend of 10 per cent was paid on £350,002 and only the 15 per cent final dividend was paid on the present capital as increased by the one-for-seven share bonus.

Expenses were much the same as in the previous year as was the provision made for depreciation, £96,972 against £96,675, but tax liabilities were reduced from £575,140 to £316,288 and net profit figured at £237,733 compared with £538,931. This net figure was swollen to £666,434 largely by £314,281 brought in, but it also included a capital profit of £53,174 (£97,231) arising from the sale of buildings, and the sum of £50,000 from an excess provision for taxation. No allocation was made to stock valuation or general reserves compared with £350,000 appropriated in the previous year but capital reserves were strengthened by the receipt of £102,769 (£97,231), an amount of £60,349 (£86,353) was set aside for additional depreciation and £60,426 was used to write off the goodwill of new subsidiaries. After providing for these outgoings and for the 25 per cent dividend distribution on the ordinary capital and 9 per cent on the participating Preference Shares which absorbed a net amount of £95,025, the carry forward was left higher by £33,298 at £347,579.

Among the many and expanding interests of the group is its important stake in the mining industry through the production at its Mitcham factory of all types of transmission beltings, including conveyor belts for all kinds of mining operations. Turnover in this field during the year improved considerably and export trade in belting and conveyors expanded in all parts of the world. Recently, the company's new Mitcham Cushion Conveyor Belt was put on the market arousing widespread interest while currently, experiments are being conducted on a plastic fireproof belt which, when perfected, should prove most suitable for use in coal mines.

So far as this side of the company's activities are concerned, the chairman, Mr. George W. Odey, says they are well placed with orders and production over the first quarter of 1952 is assured.

Rand and O.F.S. Mine Returns for February

The February mine returns for the Rand & O.F.S. producers are shown in the table below, together with the cumulative figures for each company's current financial year compared against the corresponding figures for the previous year. These two cumulative totals underline the progressive erosion of profits which is occurring as costs continue to mount. In only three mines—Blyvoor, Vlakfontein and South Roodepoort—are

profits this year running ahead of last. All the remainder show decreases, in some cases substantial ones.

The milling returns for February, a short working month, made a generally poor showing, but the two new O.F.S. producers gave a better account of operations and the list was brightened by the entry of West Driefontein to the list of producers.

Of the 45 producers announcing results, Welkom was the only mine to deal with a larger tonnage. All profits were down excepting those of New State Areas and St. Helena, while working costs were up with the exception of those of Van Dyk.

The feature in the Gold Fields group was the first monthly statement by West Driefontein, which went into production in February after trial runs early in the year. All the tonnage milled was taken from development rock and surface dumps, and despite absorption of gold, a working profit was made. Costs were high at 69s. 6d. The initial capacity of the plant is 25,000 tons but extensions will bring it up to 100,000 tons a month.

Van Dyk, of the Union Corporation, was the only mine to register a drop in costs—6d. per ton to 33s. 10d. A lower tonnage was dealt with but profit was only about £500 less than in the previous month.

The same tonnage as in January was milled by St. Helena; costs rose by 7d. per ton to 48s. 2d. and profit was the best so far.

Although milling a lower tonnage at higher cost, New State Areas made a slightly increased profit.

Company	February, 1952 Tons ('000)	Yield (oz.)	Profit (£'000)	Yr. ends	Total to Date Current Financial Year Tons ('000)	Yield (oz.)	Profit (£'000)	Total to Date Last Financial Year Tons ('000)	Yield (oz.)	Profit (£'000)
Gold Fields										
Libanon	74	14210	30.5	J	639	120,155	294	643	115,230	354
Luipaards V.	92	17310	44.2	J	789	146,555	423	808	149,872	535
Rietfontein	25	5635	26.0	D	53	11,687	55	54	11,928	63
Robinson	107	17482	5.0	D	221	35,007	16	209	33,431	28
Simmer & J.	115	18300	8.5	D	245	36,980	34	238	37,901	64
Sub Nigel	63	21945	114.6	J	531	186,357	1030	530	200,110	1279
Venterspost	93	20693	51.8	J	787	172,223	498	850	178,548	774
Vlakfontein	35	13056	73.0	D	72	26,877	153	67	26,091	151
Vogels	73	18980	72.9	D	156	39,734	153	146	36,374	163
West Drie	20	5898	3.7	J	20	52,898	37	—	—	—
Anglo American*										
Brakpan	104	19511	28.3	D	218	40,747	74	218	40,988	115
Daggas	218	52167	360.0	D	451	107,887	764	428	109,497	854
East Daggas	92	16631	63.2	D	187	33,737	132	195	36,149	178
S.A. Lands	102	18623	62.4	D	211	38,420	138	219	38,209	156
Springs	153	26229	8.9	D	314	41,495	31	328	43,037	79
Welkom	38	5144	L37.1	D	74	9,245	83	—	—	—
W. Reef Ex.	101	21370	91.3	D	209	44,200	199	179	41,219	218
Central Mining										
Blyvoor	102	63247	558.7	J	864	552,436	4977	694	500,582	4658
City Deep	142	29353	18.2	D	297	61,623	87	311	65,010	178
Consol M.R.	174	24496	32.9	J	1517	207,048	343	1502	203,166	223
Crown	247	40925	21.2	D	515	86,585	68	511	90,001	245
D. Roodep'rt	169	28991	70.5	D	342	59,319	153	348	59,113	203
East Rand P.	186	40551	134.4	D	401	87,325	310	411	83,033	336
Modder B.	53	5992	7.0	D	111	12,252	15	107	12,134	18
Modder East	108	12570	20.0	J	934	110,747	256	973	117,622	427
New Modder	19	2698	0.6	J	169	22,085	7	192	20,757	18
Rose Deep	79	11324	12.1	D	163	22,785	26	157	22,452	48
Welgedacht	31	3811	3.4	J	269	31,700	32	264	30,174	33
J.C.I.*										
E. Champ	28	4617	8.2	D	59	9,581	18	63	9,127	22
Govt.G.M.A.	209	31853	47.1	D	439	64,766	97	434	61,157	120
New State	40	6450	1.1	D	82	13,194	2	185	15,278	10
Randfontein	330	40622	25.1	D	681	83,124	55	635	78,398	109
Wit. Gold	57	6875	2.1	D	118	13,776	5	115	13,274	12
Union										
East Geduld	140	41999	329.6	D	286	85,797	677	280	84,011	683
Geduld Prop.	101	14648	37.5	D	209	30,318	78	209	31,009	99
Grootvlei	178	38712	240.0	D	373	81,132	511	385	86,623	601
Marievale	57	14340	67.2	D	119	29,752	140	119	29,779	150
St. Helena	43	8468	1.7	D	86	16,745	2	—	—	—
Van Dyk	103	15000	12.0	D	209	30,651	24	198	28,709	33
General Mining*										
S. Roodep'rt	26	5899	21.5	J	217	48,353	181	211	47,724	179
W. Rand Con	193	30234	105.1	D	394	61,791	227	392	62,645	291
Anglo Transvaal*										
N. Klerksd'p	11	1216	1.0	D	21	2,431	2	16	1,935	2
Rand Leases	183	30653	74.0	J	1464	245,995	649	1521	244,378	780
Village M.R.	33	5217	16.0	J	273	42,370	142	277	42,055	154
Others										
N. Kleinf't'n	97	12803	27.4	D	203	26,735	61	210	27,262	87
Spaarwater	10	2250	L4.2	D	21	4,598	L7	20	4,617	L6
W. Nigel*	9	—	L1.8	J	79	—	2	80	—	15

Notes.—Profit figures are in all cases figures of working profit excluding profit from sale of gold at premium prices. In case of groups marked with an asterisk (*) profit includes sundry revenue. Profit figures preceded by L indicate a loss.

Company Shorts

Paringa Takes Option on Lead Property.—Further to our note in these columns on February 22, in which it was stated that Paringa Mining & Exploration were seeking a base metal property, it is now learned that the company has taken a six months option over the Wheel of Fortune Extended lead property in the Northampton district, Western Australia. This mine is currently producing at the rate of some 600 tons of ore and 100 tons of concentrates per month. Should Paringa exercise the option, it is anticipated that the output will be substantially increased.

Anglo American Offers One for Ten.—Anglo American Corporation of South Africa is proposing to offer existing shareholders of its ordinary share capital 623,950 new 10s. ordinary shares in the proportion of one new for every ten held at a price to be determined later. Accordingly, an extraordinary general meeting has been called for March 27 in Johannesburg to consider a special resolution to increase the Corporation's authorized capital from £6,250,000 to £7,000,000 by the creation of 1,500,000 new 10s. ordinary shares. (This will raise the authorized Ordinary Share Capital from £3,250,000 to £4,000,000).

The raising of further capital by Anglo American Corporation is another step in implementing its policy to take its full share in providing funds for the continued development of the new gold mines in the Orange Free State and the Far West Rand in which it has large direct and indirect interests.

Further details of the proposed increase in capital and offer of shares to ordinary shareholders will be found on page 253.

Indian Copper Corporation.—With regard to the transfer of the Indian Copper Corporation's seat of control and management to India reported in these columns on February 1 last, the directors of Indian Copper in a circular to shareholders state that their decision was due to the considerable tax savings and to the fact that over 85 per cent of the issued stock is held by persons resident in India.

The present board will retire from office on April 6, next, when the new board will comprise Mr. A. J. Elkins, chairman and managing director of Gillanders, Arbuthnot & Co., the company's local agents and registrars in India for many years; Sir Asoka K. Roy; Sir Birendranath Mukherjee; Mr. N. D. Bangur; Mr. K. R. Fettes; and Mr. E. R. Dempster.

New Consolidated Gold Fields, who through their representatives on the board and the provision of managing and engineering staff have acted as consulting engineers and technical managers of the company for many years, have consented to act as consulting engineers and to advise on technical matters as from April 6.

Shareholders are informed that on the transfer becoming effective, the company will no longer be liable to U.K. taxation on its trading profits. Further, the directors have been advised that the company will obtain relief from Indian corporation tax equal to 1s. 3d. in the £ on the whole of its profits, if future dividends are declared payable in India. Accordingly, provision has been made in the new articles to enable dividends to be paid in rupees. On the basis of current U.K. taxation and assuming profits are maintained, "the net saving to the company which would arise from the transfer of control would give scope for the payment of increased dividends." (The dividend payment for the last four years has been 12½ per cent on the issued capital of £914,200 in 2s. shares.

All dividends paid to U.K. residents will be subject to U.K. tax. But even on the present rate of dividend the directors are advised that the net amount receivable "should be little, if any, lower than at present and would probably be higher." A member, whose world income is not in excess of £6,000 per annum would, the directors state, be assured of an increased net dividend.

An extraordinary general meeting will be held at 20, Aldermanbury, London, E.C.2, on March 26, at noon, to consider the resolution. If, the resolution is approved, the retiring directors will receive an agregate amount of £20,000 as compensation for loss of office.

South Roodepoort Main Reef.—The profit and loss account of South Roodepoort Main Reef Areas for the year ended June 30, 1951, showed that gross gold and silver revenue amounted to £932,075 (£817,528) and that net profit, after meeting all expenses including £150,877 (£81,245) for taxation, was £157,171, compared with £188,279 previously. The dividend distribution was lower at 15 per cent (17½ per cent), which required £106,550 (£124,308), leaving the carry forward at the fiscal year-end stronger at £109,084, compared with £87,589 brought in.

RAND SELECTION CORPORATION

The Sixtieth Annual General Meeting of Rand Selection Corporation, Ltd., was held recently in Johannesburg.

The Hon. H. V. Smith, the chairman, presided and, in the course of his review, said: The revenue for the year was £880,000, compared with £698,000 for the previous year. In addition, the sale of freehold property brought in £30,000, making a total of £910,000. The dividends paid by the mines of the Anglo American Group for the six months ended December 31, 1951, amounted to £2,463,000, compared with £2,403,000 for the preceding six months and £2,669,000 for the six months ended December 31, 1950.

Slightly improved profits were earned by West Rand Investment Trust, Ltd. This company has recently declared a final dividend of 9d. per share, making a total of 1s. 4½d. for the year, compared with 1s. 1½d. for the preceding year. A substantial increase in our income from that source may be expected when West Driefontein Gold Mining Co., Ltd., reaches the dividend paying stage. There were satisfactory increases in dividends from our diamond and copper interests. The dividend of 4½d. per share which South African Townships, Mining and Finance Corporation, Ltd., declared in respect of the nine months ended September 30, 1951, has not been included in our corporation's revenue for the year, but will, of course, appear in our accounts for the current year.

With regard to the producing mines of the Anglo American Corporation Group, in which your corporation is largely interested, the comparable figures of average costs for the three months prior to devaluation were 25s. 1d. per ton milled, as against 29s. 8d. per ton milled for the last three months of 1951, a rise of 4s. 7d., or approximately 18 per cent. The increase in the cost per ounce of gold produced was 33s., equivalent to a rise of 27 per cent. There remains, however, a substantial margin between the rise in the cost per ounce of gold produced of 33s. and the increase in the sterling price of gold due to devaluation of 75s. 9d. per ounce.

Factors preventing the mines milling to full capacity are shortage of native labour, shortage of power, and the occasional interruptions in coal deliveries due to the present strain on the South African Railways. Every effort is being made to overcome these difficulties.

A new phase in the development of the Orange Free State goldfields began towards the end of 1951 when the St. Helena and Welkom mines reached production. These mines started to produce gold after a much shorter development programme than has been customary for new gold mines in the past, and it was therefore to be expected that a longer time than usual would elapse between the start of crushing and the profit-earning stage.

In the Orange Free State the drilling programme was far more intensive than anything previously attempted, and the excellent results obtained therefrom gave ample evidence of the high payability of the field and enabled the companies to proceed forthwith to order the necessary plant and equipment.

The most important advantage in starting production as early as possible is that from the time the mill starts revenue is earned which covers operations that would otherwise have to be financed from capital raised from the public or other sources. This saving, which may amount to as much as £700,000 in the case of an individual mine, is naturally of greater importance when several mines have to be financed than it would be if only one mine was under consideration. When compared with pre-war days, the cost of bringing a mine to production has increased enormously, and although the effect of this increase on future profits has been greatly alleviated by the recent rise in the sterling price of gold and by the Government's policy in allowing all initial capital expenditure to be recovered before any tax is payable, the total cost of bringing the mines to the production stage has to be raised in cash before the counterbalancing influences can make themselves felt.

Secondly, there is the consideration that in these days it is necessary to order a new reduction plant two-and-a-half years before the date when production is due to start, and it is clear that this date would be very considerably deferred were it still necessary to await development from underground before placing the order.

The Western Holdings Company, which recently raised sufficient money to finance its operations until it reaches a milled tonnage of 75,000 per month, has announced that it hopes to reach production on a small scale in the middle of this year.

Base metal prices, as well as the current production of copper, remain at a very high level, and the Rhodesian base metal mining companies continue to earn extremely satisfactory profits, which will make an increasingly important contribution to our revenue in the current year.

Anglo American Investment Trust, Ltd., through which the Corporation's principal interests in the diamond industry are held, earned a record profit of £2,259,000 during the year ended December 31, 1951. Dividends amount to 12s. per share, compared with 7s. for the preceding year. Diamond sales in 1951 totalled £65,000,000 and exceeded the previous year's record figure by £14,000,000.

The report and accounts were adopted.

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NOTICE TO SHAREHOLDERS

EXTRAORDINARY GENERAL MEETING

NOTICE IS HEREBY GIVEN that an Extraordinary General Meeting of Shareholders of the above Corporation will be held at 44, Main Street, Johannesburg, on Thursday, the 27th March, 1952, at 11 a.m., for the following business:—

A. To consider, and if deemed fit, to pass the following resolution, with or without modification, as a Special Resolution in the manner required by the provisions of the Companies Act, 1926, as amended, namely:—

(1) That the authorized capital of the Corporation be and it is hereby increased from £6,250,000 divided into—

(*a*) 6,500,000 Ordinary shares of 10s. each,

(*b*) 1,241,250 Preference shares of 10s. each,

(*c*) £2,379,375 Preferred Stock,

to £7,000,000 divided into—

(*a*) 8,000,000 Ordinary shares of 10s. each,

(*b*) 1,241,250 Preference shares of 10s. each,

(*c*) £2,379,375 Preferred Stock,

by the creation of 1,500,000 Ordinary shares of 10s. each, which shares shall, when issued, rank *pari passu* with the existing Ordinary shares of the Corporation.

B. To consider, and if deemed fit, to pass the following resolution, with or without modification, as an Ordinary Resolution, namely:—

That, subject to the registration of the Special Resolution increasing the authorized capital of the Corporation from £6,250,000 to £7,000,000, the Directors be and they are hereby authorized to issue all or any of the 1,500,000 Ordinary shares of 10s. each, comprising the said increase in capital, at such time or times and upon such terms and conditions and to such person or persons, company or companies, as they may determine.

The Transfer Registers and Register of Members relating to the Ordinary shares of the Corporation will be closed in both Johannesburg and London from the 21st March, 1952, to the 27th March, 1952, both days inclusive.

Holders of Share Warrants to Bearer intending to vote at the Meeting must comply with the regulations of the Corporation under which Share Warrants to Bearer are issued.

By Order of the Board,

London Office: W. E. GROVES,
11, Old Jewry, E.C.2. *London Secretary.*
5th March, 1952.

British Metal Corporation (Central Africa).—British Metal Corporation (Central Africa) which is a wholly owned subsidiary of the British Metal Corporation Ltd., has an authorized capital of £100,000, and has now begun operations from its temporary headquarters at 55, Exchange Buildings, Selborne Avenue, Bulawayo.

The objective of the company is to participate in the international trade of Central Africa, particularly in non-ferrous metals and ores.

The chairman of the new company is The Hon. Humphrey Gibbs, and the other directors are Mr. J. C. Budd, Mr. R. G. Cumming and Mr. C. G. Frost.

Padley & Venables: Change of Address.—Padley & Venables which formerly operated from the office of Oswald Record & Co., at 17, Victoria Street, London, S.W.1, have now moved their office to 66, Victoria Street, London, S.W.1, telephone Victoria 8856. All communications should now be addressed to the company at their new headquarters.

A. Straus & Co., formerly of 37-39, Lime Street, London, E.C.3, have now moved to Plantation House, Mincing Lane, London, E.C.3, telephone: Avenue 5551.

Mr. W. E. Sinclair, M.I.M.M., Consulting Mining Engineer, is leaving Johannesburg shortly on an extended professional visit, first to the Northern Transvaal and then on to Nyasaland, and will be away for several weeks.

W. E. SINCLAIR, M.I.M.M.
Consulting Mining Engineer
South & East Africa & Rhodesia
P.O. Box 1183. JOHANNESBURG

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The Governing Body invites applications for a post as LECTURER IN THE DEPARTMENT OF MINING AND GEOLOGY.

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Further particulars and application form will be sent by the undersigned on receipt of a stamped, addressed foolscap envelope. Last date for receipt of applications: Saturday, 22nd March, 1952. Applications not on the form provided will be disregarded.

E. C. SMITH, Principal.

SITUATIONS VACANT ADVERTISED ABOVE.—*The Notification of Vacancies Order, 1952, must be complied with where applicable.*

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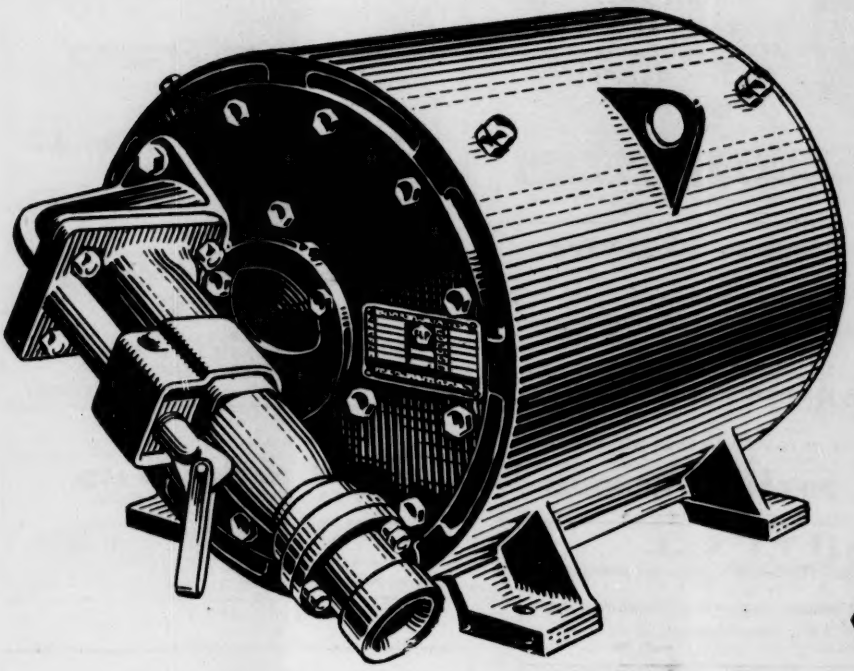

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